STEEL The Metalworking Weekly

A PENTON PUBLICATION

SEPTEMBER 4, 1961

AUTOMATION AND JOBS

Technological change has been creating new jobs since the wheel was invented. The displacements that come with it have been exaggerated. This special issue shows why we need more, not less, automation to cut costs, increase sales, make new jobs, and save old ones . . . . . Page 53

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COMPLETE CONTENTS — PAGE 19

Want to **TALK GEARS?**

get down to brass tacks quickly with a
DOUBLE DIAMOND *engineer*

All Double Diamond representatives are engineers whose specialty is gears. Whether you're in the thinking, planning, or blueprint stage you can get help from a Double Diamond specialist, whether you buy or not. One thing is certain. If you buy, Double Diamond gears will measure up to your requirements and ours . . . will produce low installed cost . . . will serve economically and dependably . . . will do credit to your product and reputation. A phone call or letter will have you "talking gears" soon.

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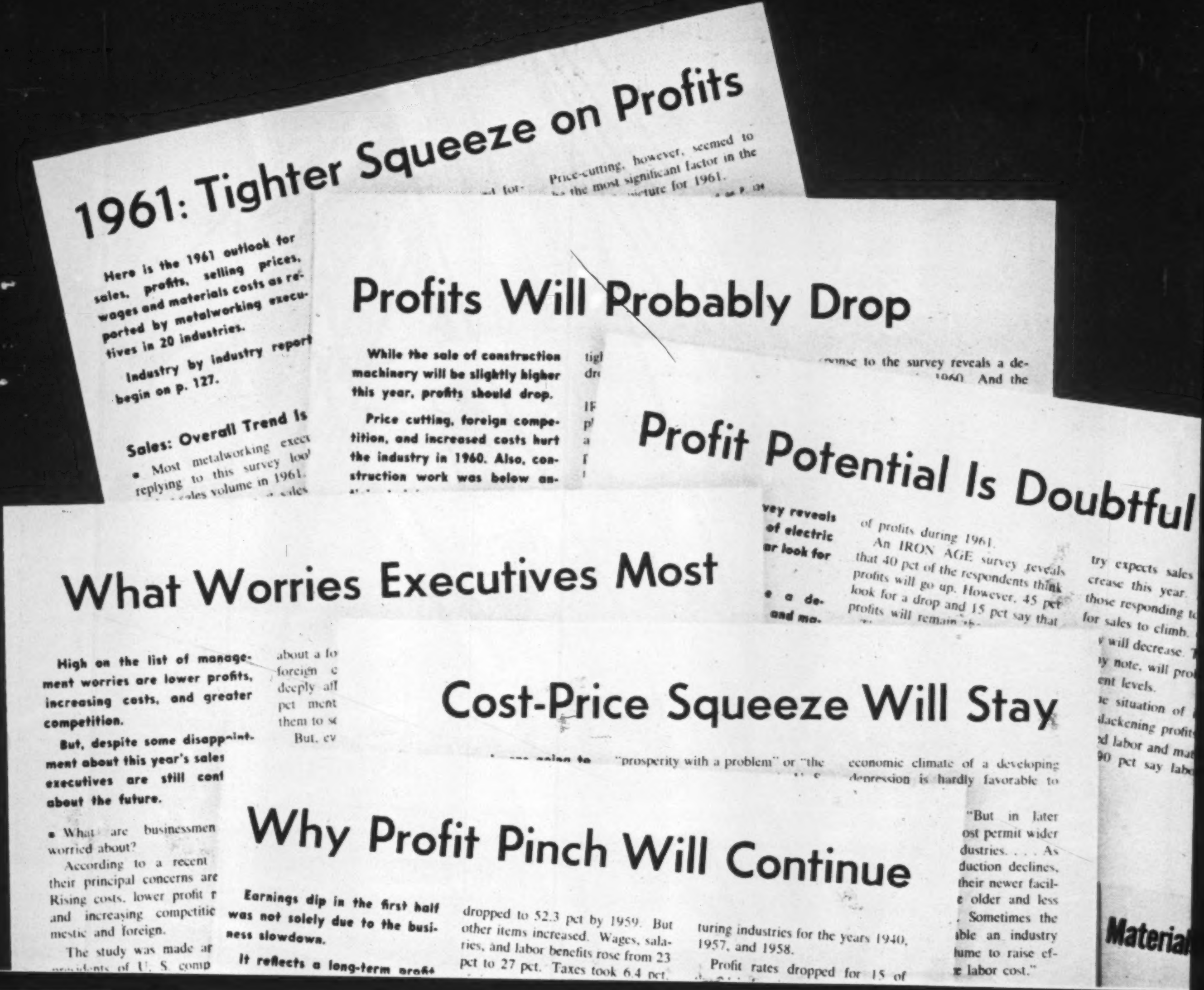

1961: Tighter Squeeze on Profits

Here is the 1961 outlook for sales, profits, selling prices, wages and materials costs as reported by metalworking executives in 20 industries.

Industry by industry reports begin on p. 127.

Sales: Overall Trend Is

• Most metalworking exec replying to this survey loo sales volume in 1961.

Price-cutting, however, seemed to be the most significant factor in the picture for 1961.

Profits Will Probably Drop

While the sale of construction machinery will be slightly higher this year, profits should drop.

Price cutting, foreign competition, and increased costs hurt the industry in 1960. Also, construction work was below an-

ponse to the survey reveals a de- 1960. And the

Profit Potential Is Doubtful

vey reveals of electric ar look for e a de- and ma-

of profits during 1961.

An IRON AGE survey reveals that 40 pct of the respondents think profits will go up. However, 45 pct look for a drop and 15 pct say that profits will remain

try expects sales crease this year. those responding t for sales to climb. will decrease. y note, will pro ent levels. e situation of slackening profit d labor and ma 90 pct say lab

What Worries Executives Most

High on the list of management worries are lower profits, increasing costs, and greater competition.

But, despite some disappointment about this year's sales executives are still con about the future.

• What are businessmen worried about?

According to a recent their principal concerns are Rising costs, lower profit r and increasing competitic mestic and foreign.

The study was made ar presidents of U. S. comp

about a fo foreign c deeply aff pct ment them to s But, ev

Cost-Price Squeeze Will Stay

"prosperity with a problem" or "the

economic climate of a developing depression is hardly favorable to

"But in later ost permit wider dustries. . . . As duction declines, their newer facil- e older and less . Sometimes the ible an industry lume to raise ef- e labor cost."

Why Profit Pinch Will Continue

Earnings dip in the first half was not solely due to the business slowdown.

It reflects a long-term profit

dropped to 52.3 pct by 1959. But other items increased. Wages, salaries, and labor benefits rose from 23 pct to 27 pct. Taxes took 6.4 pct.

turing industries for the years 1940, 1957, and 1958.

Profit rates dropped for 15 of

Material

Help?

Try your local service center, if you buy steel in small or moderate lots. That's where the cost of steel (processed or not) is often *less* than the *final* cost of steel you buy from a mill and keep in inventory.

Consider your "costs of possession"—rent, insurance, interest on capital, accounting, handling, wastage, taxes, and a few others. These are costs your service center can help you reduce or completely eliminate. Talk it over today.

Service centers from coast to coast stock top-quality Bethlehem structurals, sheets, plates, bars, tool steels, and alloy steels. And deliver them fast.

Steel

For Strength
. . . Economy
. . . Versatility

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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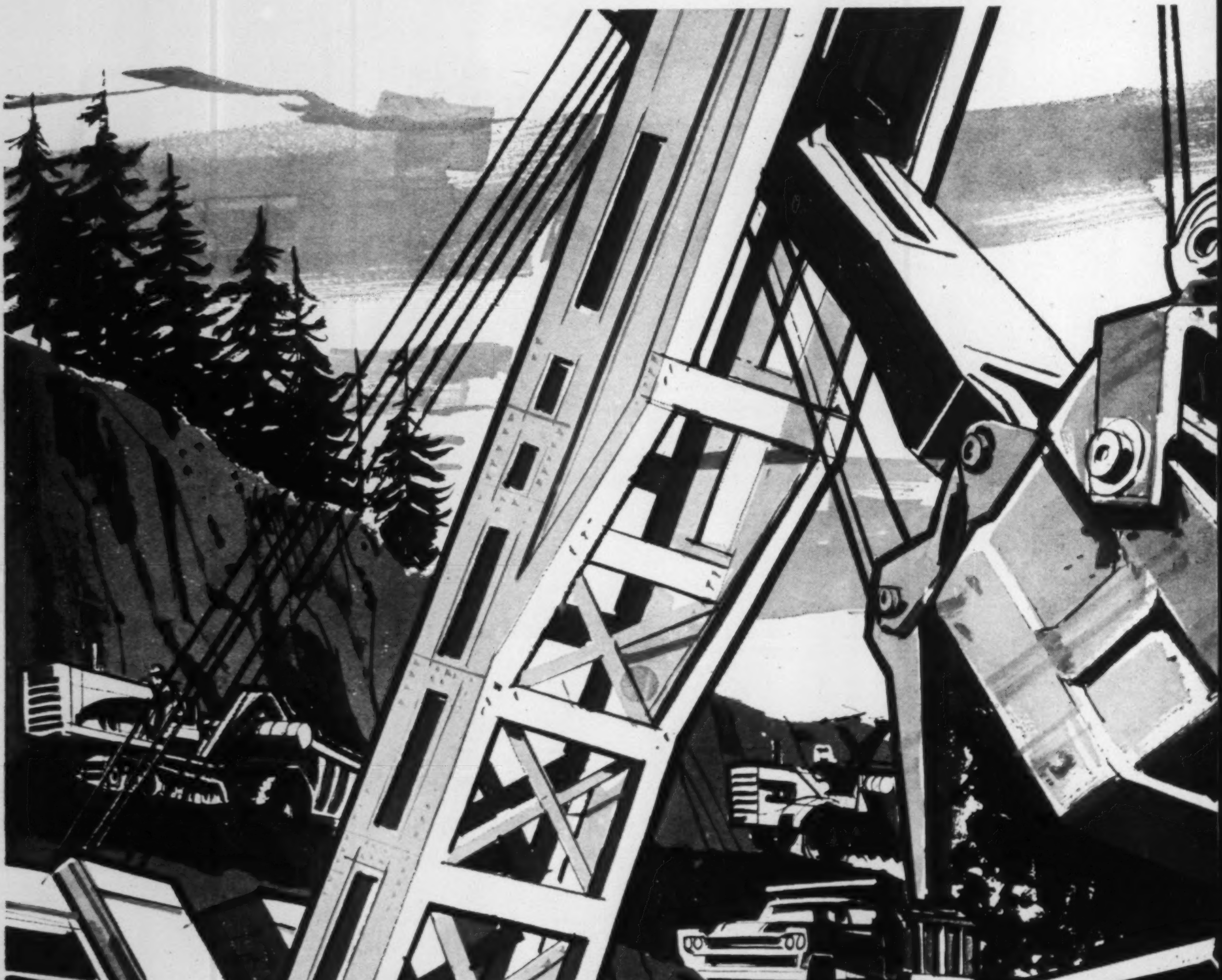


New steels are born at Armco

Armco Division, Armco Steel Corporation
2081 Curtis Street, Middletown, Ohio

I'd like more information on Armco's High Strength, Low Alloy Steel

No. . . . . for use in . . . .
Name . . . . Title . . . .
Firm . . . .
Street . . . .
City . . . . Zone . . . . . State . . . .

Put "MUSCLE" Where You Need it ...AT LOW COST... With Armco High Strength Steels

You can build for strength at low cost with Armco High Strength Steels. Their strength-price relationships mean savings in light-weight structures that must be husky.

Meet your **exact** needs. Armco High Strength Steels are a **group** of special alloys with varying combinations of corrosion resistance, workability, and physical properties.

Complete selection

A special-analysis steel is produced for each of Armco's high strength, low-alloy steels. This selection is as complete as any group of low-alloy steels in the industry.

Find out for yourself how you can save with special Armco High Strength Steels. Just call your nearest Armco Sales Office or fill in and mail the coupon.

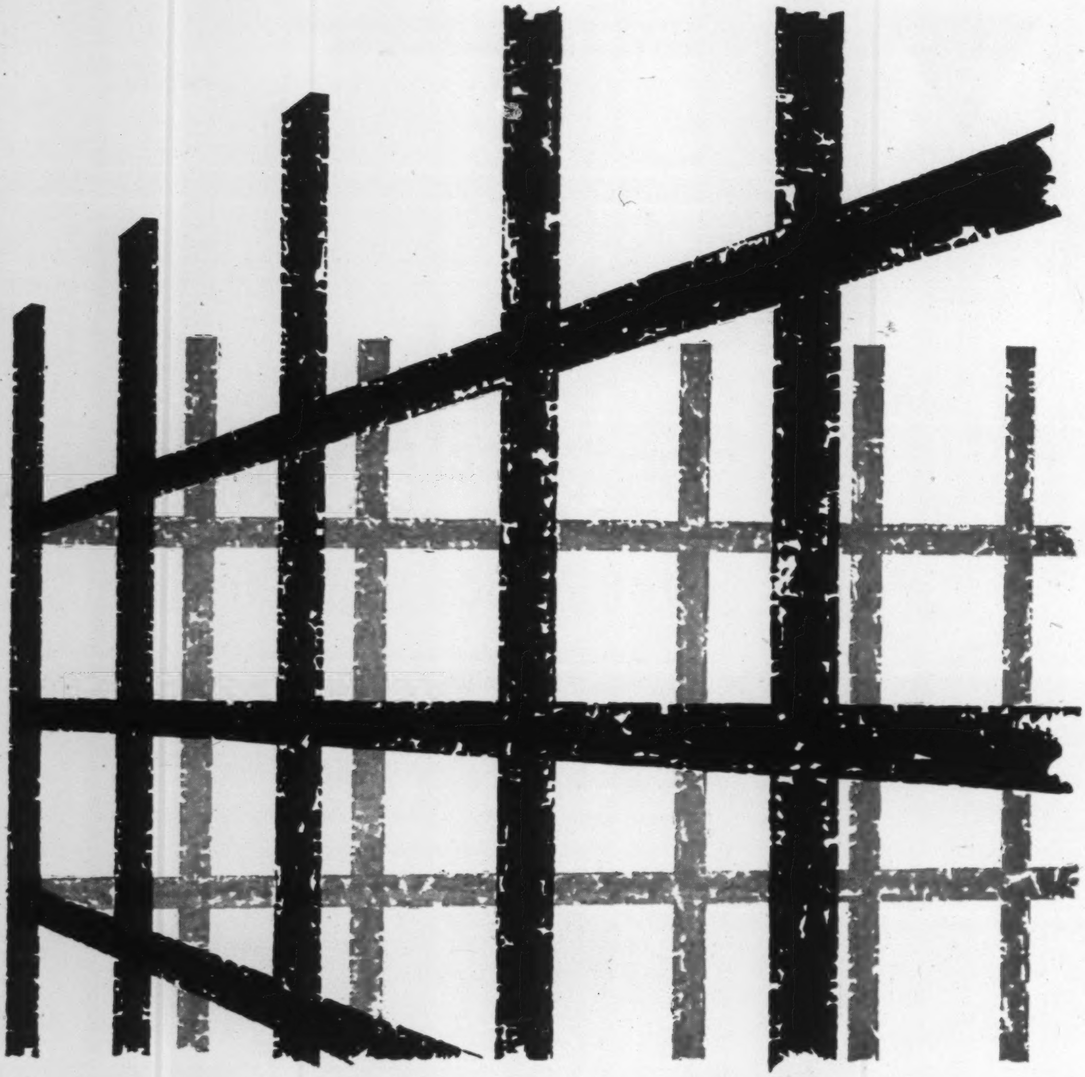
Steel

Identify sturdy, durable modern steels in your products. Use this label.

Armco High Strength Low Alloy Steels

Armco Type	No. 1	No. 2	No. 4	No. 5	No. 6	No. 7
Atmospheric Corrosion Resistance	4 to 6 times mild carbon steels	4 to 6 times mild carbon steels	Equal to copper-bearing mild steels	Equal to copper-bearing mild steels	Equal to mild steels	Equal to mild steels
Yield Point	50,000 psi min.	45,000 psi min.	50,000 psi min.	50,000 psi min.	50,000 psi min.	45,000 psi min.
Tensile Strength	70,000 psi min.	64,000 psi typ.	70,000 psi min.	70,000 psi min.	70,000 psi min.	65,000 psi min.
Fabricating Properties—As Rolled	Average	Good	Fair—parallel bends must have radius	Fair—parallel bends must have radius	Average	Good

ARMCO **Armco Division**



New support for lowered construction costs

Armco Steel Corp.	†
The Babcock & Wilcox Co., Tubular Products Div.	† ▲
The Carpenter Steel Co., Alloy Tube Div.	▲
Jones & Laughlin Steel Corp., Electricweld Tube Div.	†
National Tube Div., United States Steel Corp.	†
Ohio Seamless Tube Div., Copperweld Steel Co.	†
Republic Steel Corp., Steel and Tubes Div.	† ▲
Revere Copper & Brass Inc., Rome Mfg. Co. Div.	† ▲
Sawhill Tubular Products, Inc.	† ▲
Southeastern Metals Co.	†
The Standard Tube Co.	† ▲
Superior Tube Co.	▲
Trent Tube Co., Subs. Crucible Steel Co. of America	▲
Union Steel Corp.	▲
Van Huffel Tube Corp.	†
Wall Tube & Metal Products Co.	▲

▲ PRODUCES WELDED STAINLESS STEEL TUBE
† PRODUCES WELDED CARBON STEEL TUBE

Structural steel men are finding excellent opportunities for savings in welded steel tubing. Both on-site and prefabricated assembly can be faster because of the excellent welding characteristics. You get the efficiency of a thin-walled, hollow section with trimness of line that integrates well with other materials—often the clean lines eliminate need for trim. Tubing can be formed to any shape—and new larger sizes and heavier wall thickness are opening new opportunities for lowered costs.

The practicality of utilizing the light-weight-to-high-strength ratio of welded steel tubing has been proved by recent experience — in modern office buildings, schools, commercial buildings—even homes. Current example: supporting curtain walls. Many of the quality tube producers listed here can supply information, or write Dept. ST-5, for free Booklet 8591, Welded Steel Tube Institute, Inc., Hanna Bldg., Cleveland, Ohio.

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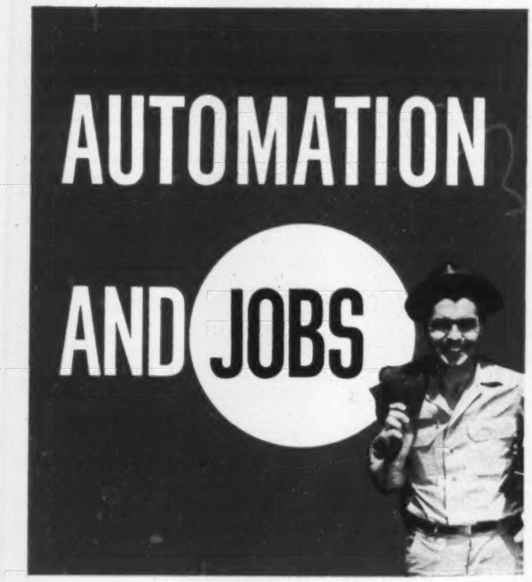
WELDED STEEL TUBE INSTITUTE, INC.

STEEL

Servicenter

Please direct all correspondence to attention of Ed Service, STEEL, 1213 W. Third St., Cleveland 13, Ohio.

September 4, 1961



We are repeating this issue's cover because it's a dramatic way to announce our fourth impact issue, which begins on Page 53. The editors have put together a valuable study on what they think will be a major problem in the 1960s.

Bound reprints of the report on Automation and Jobs are available at $2 a single copy; prices for larger quantities can be had on request. Write Reprint Dept., STEEL, Penton Bldg., Cleveland 13, Ohio.

Material, Material, Material

Although the editors devote 40 pages to discussing automation, they could have used 80. The Holland Committee hearings on the subject take 793 pages of small type, and that was only one of more than 300 reports, specialists, managers, and other sources of information STEEL editors consulted.

They have boiled down, summarized, and selected to give you a distilled product that you can use in your planning for mechanization.

Space Age Schnozzola

Add a smelling machine to your roster of automated conveniences. It will tell a spaceman, even if his best friends won't, when he needs an underarm deodorant.

In fact, Aerojet-General Corp. experts say the device, called a gas chromatograph, holds promise of unlocking all sorts of fantastic new frontiers for medical science. It takes gas molecules, or vapors of anything, and automatically breaks the odor down to its chemical components. Even hard and relatively odorless things, such as wood, can be heated to give off vapor which the machine analyzes to identify the material.

Or it can smell cheese, and tell you if it's bleu, swiss, limburger, or what have you. You'd think anyone could recognize limburger, but—the machine does it without making a face.

A possibility: Cheese testers using such equipment may look at each other happily and say: "Aren't you glad you use dials?"

Impact Sidelight

We're rather proud of the unique chart on Page 55, showing the revolution worked in farming by technological change. The data go back to 1860, and Associate Editor Bob Jaynes labored 10 man-days to compile it. That's not counting the extensive help he obtained from statisticians at the Federal Reserve Bank of Cleveland and the U. S. Departments of Agriculture and Labor.

Incidental Intelligence

Item: The Institute of Scrap Iron & Steel's 1961 Yearbook lists these new grades of alloy scrap: Aroma, Daffy, Daisy, Lemon, Peach, Pekoe, Taffy, Nadir, Natty.

Item: Norton Co. is translating STEEL's "Grinding Experts Challenge Tradition" (Apr. 24, p. 132) into Italian for its plant personnel in Italy.

History Repeating?

The issue of STEEL, Sept. 1, 1941, included these stories:

1. How rising wage rates were affecting manufacturers.

2. How the Steelworkers' Organizing Committee (predecessor of the United Steelworkers of America) had signed its first whitecollar contract.

3. How manufacturers should go about getting defense business.

4. How new controls were shaping up for the economy.

That sounds disturbingly like September, 1961, doesn't it?

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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. . . means alloy flexibility

Through investment casting, your metal parts can be made in a wide range of ferrous, nonferrous and super alloys. Results — better performance . . . longer life . . . lower costs!

This part for can making machinery now cast in a non-machinable alloy offers a very high degree of resistance to wear and corrosion. Results — costly parts replacement problems ended.

Better alloys often cost no more than the "inexpensive" ones when your part is an investment casting. What counts is *castability*, not machinability.

Write for complete technical and facilities information.

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Milford 2, New Hampshire

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Fluid Power news

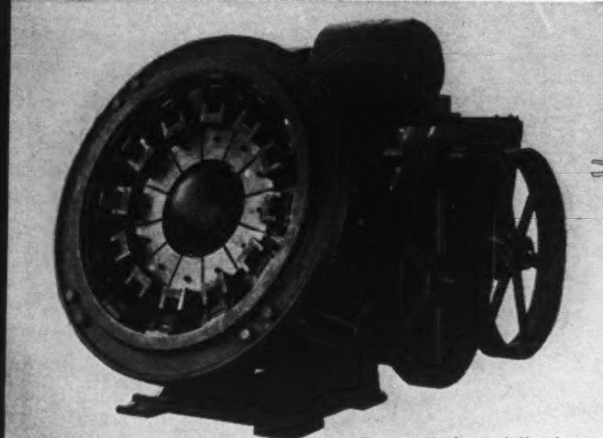
1921 1961
OILGEAR
40
Years of Fluid Power

Report No. 11,601 From Oilgear Application-Engineering Files

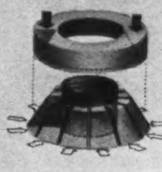
HOW OILGEAR HEAVY-DUTY POWER-PAKS EXTENDED WORKING RANGE OF GROTNES MACHINES

CUSTOMER: *The Grotnes Machine Works, Chicago, Illinois.*

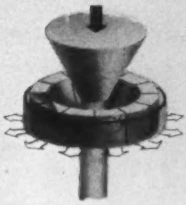
DATA: Grotnes expanders and shrinkers are used for forming and sizing sheet metal parts and heavy rings to tolerances of ±.002" without heat, machining, or waste. Any continuous cross-section part (square, round, oval, etc.) is expanded over jaws mounted in a slotted table. The jaws are moved radially outward by a drawbar-actuated cone, forming or sizing the part by stressing the metal beyond its yield point to induce a permanent set. In shrinking, the jaws are forced inward against the part by a tapered ring or toggle links. World-wide acceptance of this unique method has led to industrial requests for Grotnes machines with greater working forces, longer strokes, more uniform power than are practical or possible with mechanical drives using gear trains and crankshafts.



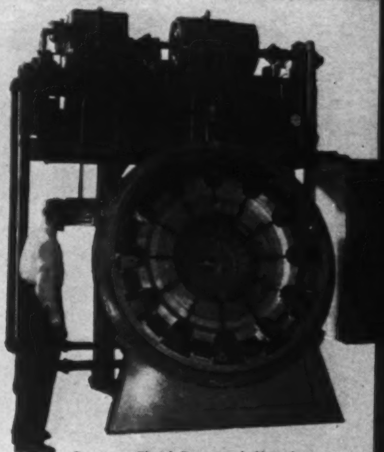
Grotnes Mechanical Shrinker



Grotnes Shrinking Method

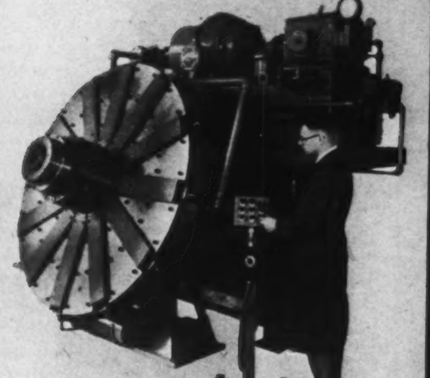


Grotnes Expanding Method



Grotnes Fluid-Powered Shrinker

SOLUTION: Shown above are two Grotnes shrinkers—one mechanically powered, the other Oilgear Fluid Powered for greater tonnage, longer stroke, more uniform power. Note the neat appearance of this new unit with its convenient, simple panel for precise, automatic control. Shown, right, is one of a new line of Grotnes expanders designed specifically for Fluid Power operation. Capacities range up to 1,580 tons on the new expanders; to 800 tons on the new shrinkers—based on 3,000 psi pressure provided by Oilgear application-engineered Heavy-Duty Power-Paks. Performance and control on these new, larger machines has been so outstanding that Grotnes is now equipping expanders as small as 25 tons drawbar pull with Oilgear Power-Paks. This is just one example of Oilgear cooperation and teamwork with designers and builders of machines for industry. An Oilgear Power-Pak is more than just a clean-appearing, unitized assembly of a pump, motor, reservoir, valves and controls . . . it is an efficient, leaktight, easy-to-install, Heavy-Duty Fluid Power system based on over 35 years of pioneering-engineering-knowledge that provides: automatic, electric power conservation; precision-controlled pressures, positions, cycle times; dependable operation; unit responsibility for the entire power system. Because of Oilgear's long reputation for dependable, trouble-free Fluid Power for virtually any application, Oilgear has become a name that all industry trusts . . . and uses.

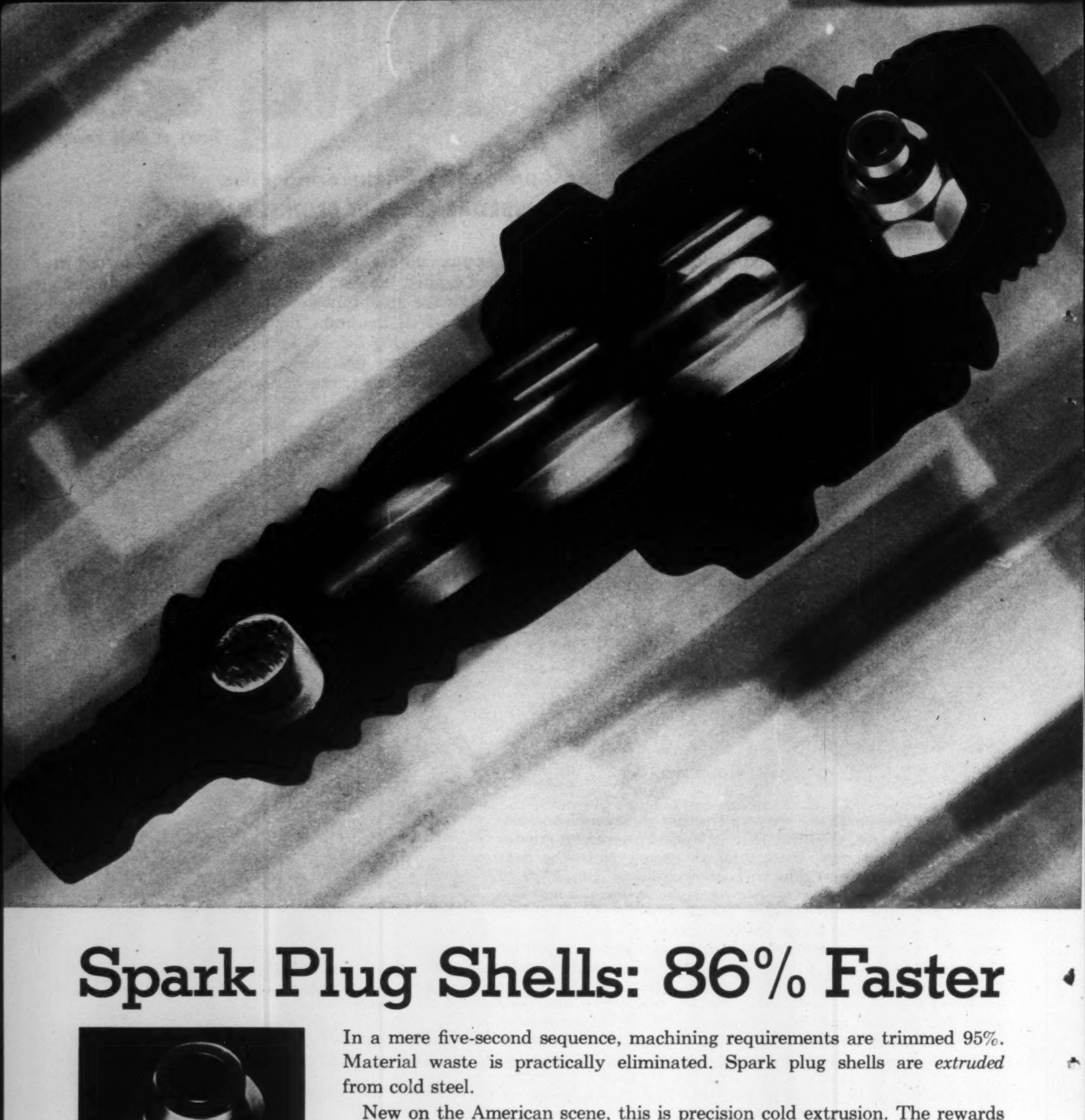


Grotnes Fluid-Powered Expander

For practical solutions to your linear or rotary drive and control problems, call the factory-trained Oilgear application-engineer in your vicinity. Or write, stating your specific requirements, directly to:

THE OILGEAR COMPANY
Application-Engineered Fluid Power Systems
1572 WEST PIERCE STREET • MILWAUKEE 4, WISCONSIN

Oilgear application-engineered Power-Paks are also used extensively on hotplate, plywood, pulp-baling, injection molding, extruding, forming, and other presses. Oilgear rotary drive and control systems are equally well accepted in virtually every field of manufacturing and processing. For accurately controlled linear or rotary power . . . for the lowest cost per year . . . check with Oilgear!



Spark Plug Shells: 86% Faster

In a mere five-second sequence, machining requirements are trimmed 95%. Material waste is practically eliminated. Spark plug shells are *extruded* from cold steel.

New on the American scene, this is precision cold extrusion. The rewards are great but the technology can be complex. Read the special report dealing with cold extrusion on the opposite page.

Republic Steel is the nation's largest supplier of carbon and alloy steels for precision cold extrusion—hot rolled, cold finished, and wire. More cold extrusion experience promises to save you time and money.

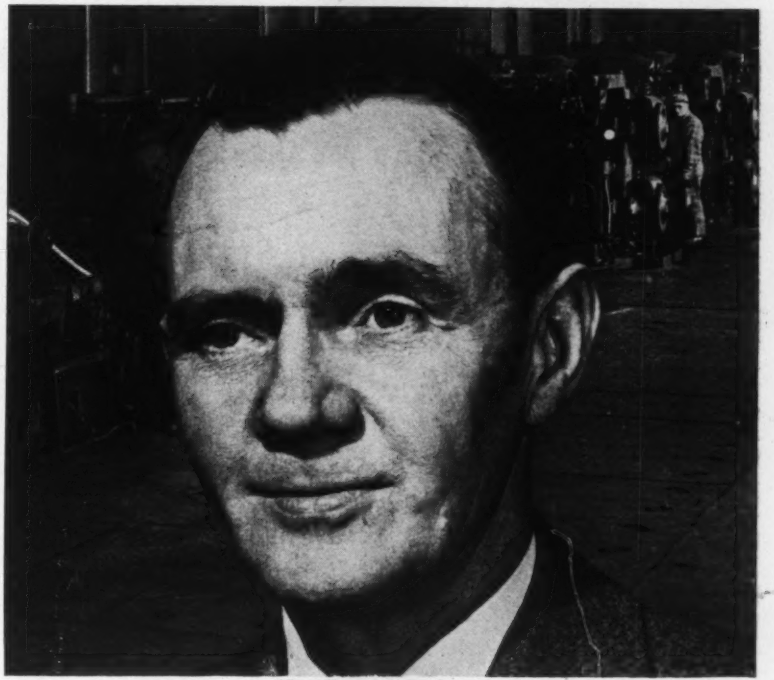
May we serve you? For complete information, contact your nearest Republic sales office or write: *Republic Steel Corporation, Dept. ST-2210-A, 1441 Republic Building, Cleveland 1, Ohio.*

STRONG
MODERN
DEPENDABLE

REPUBLIC HAS THE FEEL FOR MODERN STEEL

Trial, Error, and 30% Savings

Precision cold extrusion is slashing steel waste, producing steel parts faster, but you need more than steel


Metallurgist Rodgers

Chief Metallurgist Bill Rodgers (right), Republic Steel Corporation, helps people produce three steel parts for the price of two. It's being done, by a growing number of Republic customers, and a process called cold extrusion.

With one of the largest field metallurgical staffs in the industry, Rodgers and Republic are helping customers make the cold extrusion process work. It isn't easy. You need a feasible part design, adequate production run, the right steel, extrusion dies that can deform cold steel without destroying it, and proper lubrication to assure uniform movement. Despite progress, trial-and-error is the rule rather than the exception in determining final die designs and material specifications.

Impact of cold extrusion—"Whether or not the public hears of cold extrusion, they're going to feel it," says Rodgers. "Here is a process that can cut the cost of steel parts by 30-50%. It's especially suited to big production runs—parts produced in the tens or hundreds of thousands. Potential savings are fantastic."

The nation's largest supplier of steels for precision cold extrusion, Republic is involved in two out of every four parts produced by this new method. This experience is utilized to its full advantage by customers. As for steel, Republic has built new facilities (the $20 million Chicago 11" bar mill, for example), and modernized existing facilities such as the Canton 8" mill, to supply the products needed.

The process—According to Rodgers, extrusion dies are designed to confine and direct the deformation of steel under severe pressure. Completed or nearly completed parts are produced in one operation. Machining requirements are always reduced, often eliminated.

Five great economies—

. . . Faster production. Steel can be extruded or deformed faster than it can be cut or milled.

. . . Less handling. Steel for cold extrusion normally enters production equipment in the form of coils and bars, leaves as a finished or nearly finished part.

. . . Less material waste. One spark plug shell manufacturer has reduced steel waste by 95%.

. . . Less machining. The cold extrusion process reduces or eliminates machining. Tolerances and surfaces are excellent.

. . . Stronger parts. Cold extrusion assures more uniform flow lines of the grains. As the process is a form of cold work, physical properties of the steel are increased.

What kind of steel—"Primary requirement is that steel be properly conditioned and in suitable tempers," says Rodgers. "Chemistries depend on the physical requirements of the completed part and on the capabilities of the cold extrusion equipment. We work with the customer and his equipment supplier in determining the best steel, proper thermal treatment, and design considerations."

According to Rodgers, proper annealing is especially important in cold extrusion. Annealing increases the malleability, uniformity, and internal quality of steel. Because of this, Republic has installed new atmosphere controlled, continuous annealing furnaces in the Chicago 11" bar mill. Hot rolled, cold finished, or wire drawn steels are supplied in coils, cut lengths, and occasionally in blanks."

Role of tool and design engineers— —Parts are normally redesigned to suit or simplify the cold extrusion process. It is the tool and die engineers or the design engineers, according to Rodgers, who most often spot the potential application. With the help of equipment manufacturers and the steel supplier, these men determine precise section changes, required extrusions, and suitable steel chemistries. It remains for the tool and die engineer to design and produce the most important ingredient of all—the cold extrusion dies.

More than steel—"We can supply steel for cold extrusion from any of our bar mills, and from our Union Drawn or wire mills," says Rodgers. "More than that, we offer the technical assistance. Republic is supplying steel used in the cold extrusion of spark plug shells, piston pins, gears, shafts, universal yokes, valve lifters and caps, pivot nuts, missile components, military gun barrels, and many other parts. We do our best to save the customer time and money."

REPUBLIC STEEL

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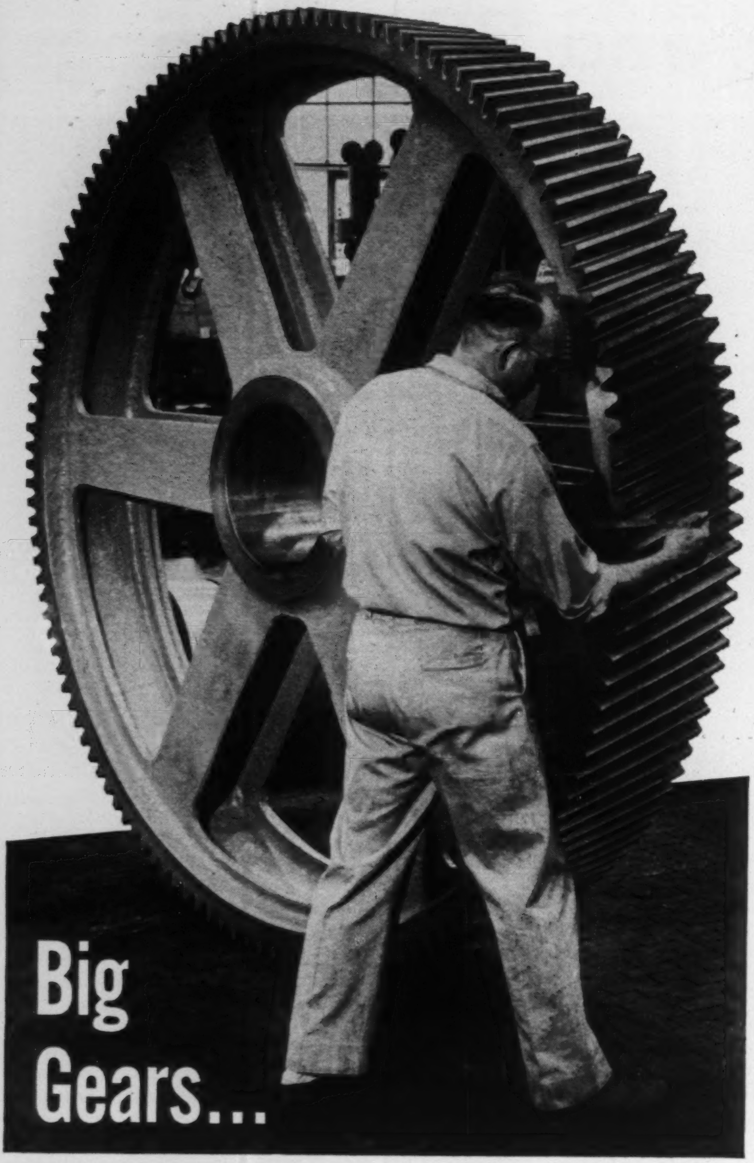

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CALENDAR

OF MEETINGS

Sept. 10-12, Steel Service Center Institute: Great Lakes regional meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Institute's address: 540 Terminal Tower, Cleveland 13, Ohio. Executive vice president: Robert G. Welch.

Sept. 13-15, Marking Device Association: Convention, Pick-Congress Hotel, Chicago. Association's address: 912 Chicago Ave., Evanston, Ill. Executive secretary: T. H. Brinkman.

Sept. 14-16, Packaging Machinery Manufacturers Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute's address: 60 E. 42nd St., New York 17, N. Y. Executive director: Russell L. Sears.

Sept. 17-21, Non-ferrous Founders' Society: Annual meeting, Shawnee Inn. Shawnee-on-Delaware, Pa. Society's address: 1604 Chicago Ave., Evanston, Ill. Executive secretary: Herbert F. Scobie.

Sept. 24-26, Steel Founders' Society of America: Fall meeting, The Homestead, Hot Springs, Va. Society's address: 606 Terminal Tower, Cleveland 13, Ohio. Executive vice president: F. Kermit Donaldson.

Sept. 24-28, Pressed Metal Institute: Annual meeting, Grand Hotel, Point Clear, Ala. Institute's address: 3673 Lee Rd., Cleveland, Ohio. Managing director: J. D. Keith.

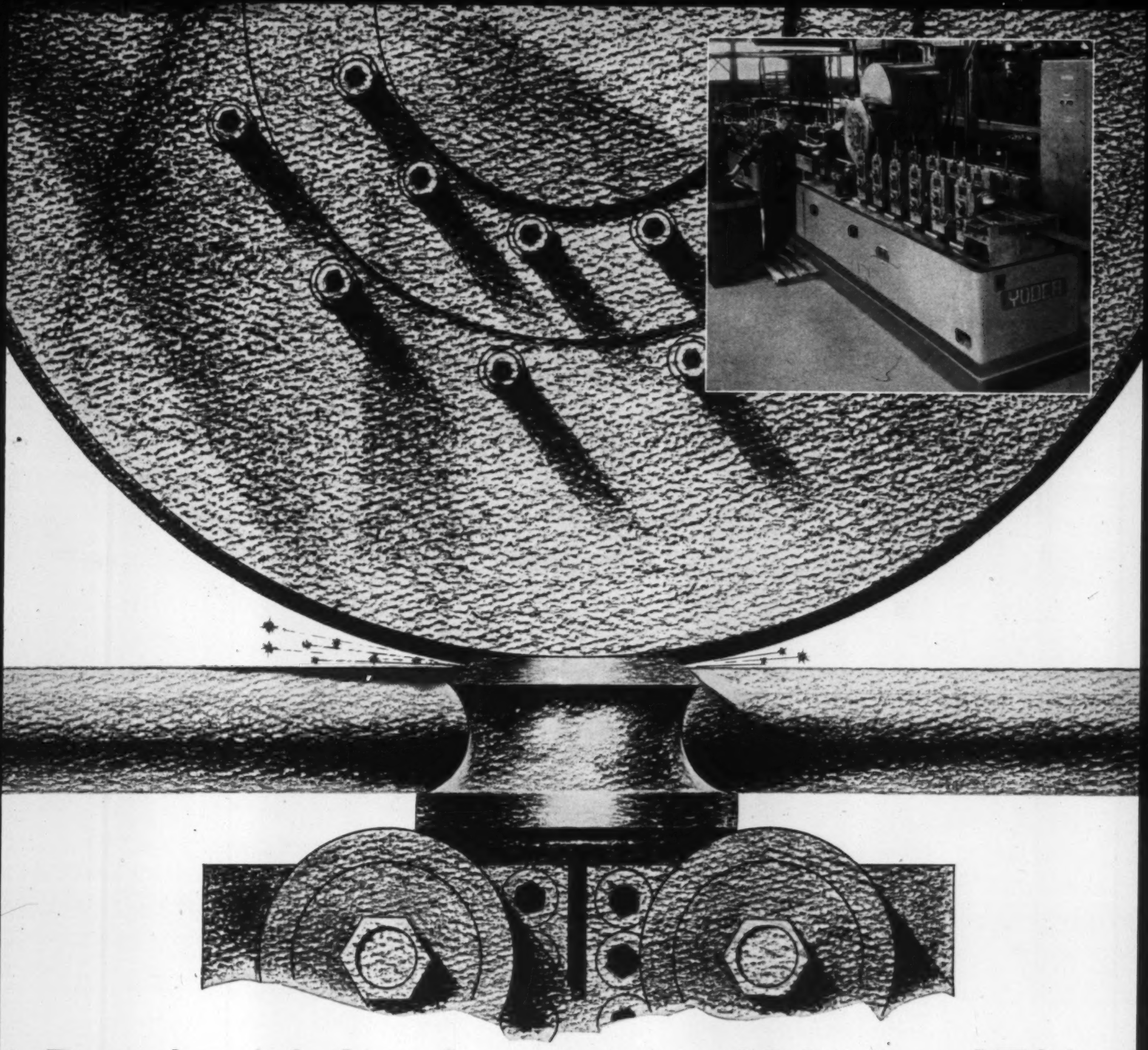
Sept. 25-28, American Welding Society: National fall meeting, Adolphus Hotel, Dallas. Society's address: 33 W. 39th St., New York 18, N. Y. National secretary: Fred L. Plummer.

Sept. 25-28, Association of Iron & Steel Engineers: Annual convention, Penn-Sheraton Hotel, Pittsburgh. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Sept. 25-28, Industrial Building Exposition and Congress: New York Coliseum. Contact Clapp & Poliak Inc., 34 Madison Ave., New York 17, N. Y.

Sept. 27-28, American Die Casting Institute Inc.: Annual meeting, Edgewater Beach Hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N. Y. Secretary: David Laine.

Oct. 4-6, American Machine Tool Distributors' Assn.: Fall meeting, Penn-Sheraton Hotel, Pittsburgh. Association's address: 1500 Massachusetts Ave. N.W., Washington 5, D. C. General manager: James C. Kelley.



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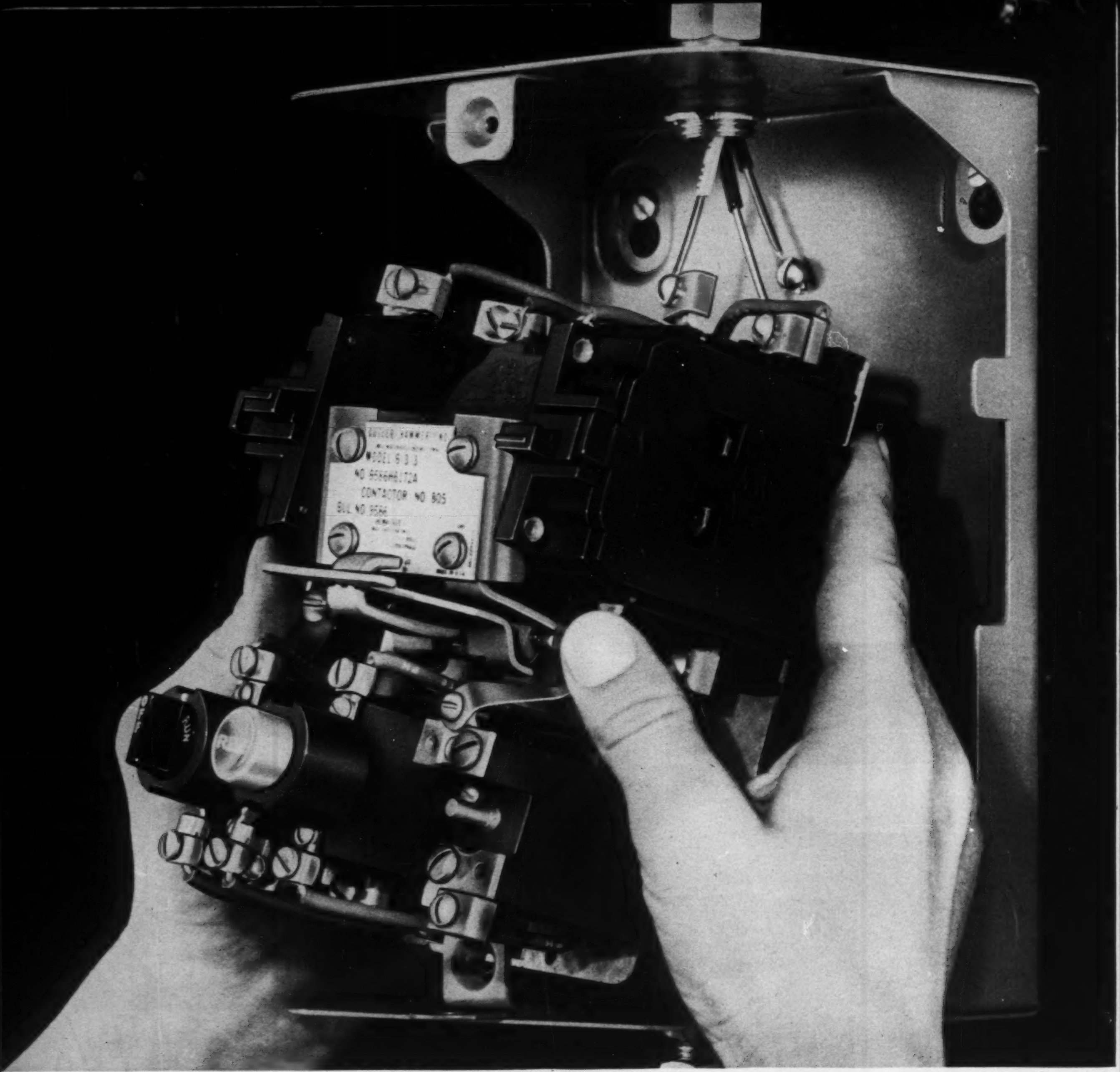
CUTLER-HAMMER INC.
MODEL 6-3-3
NO 9586H6172A
CONTACTOR NO 805
BUL NO 9586

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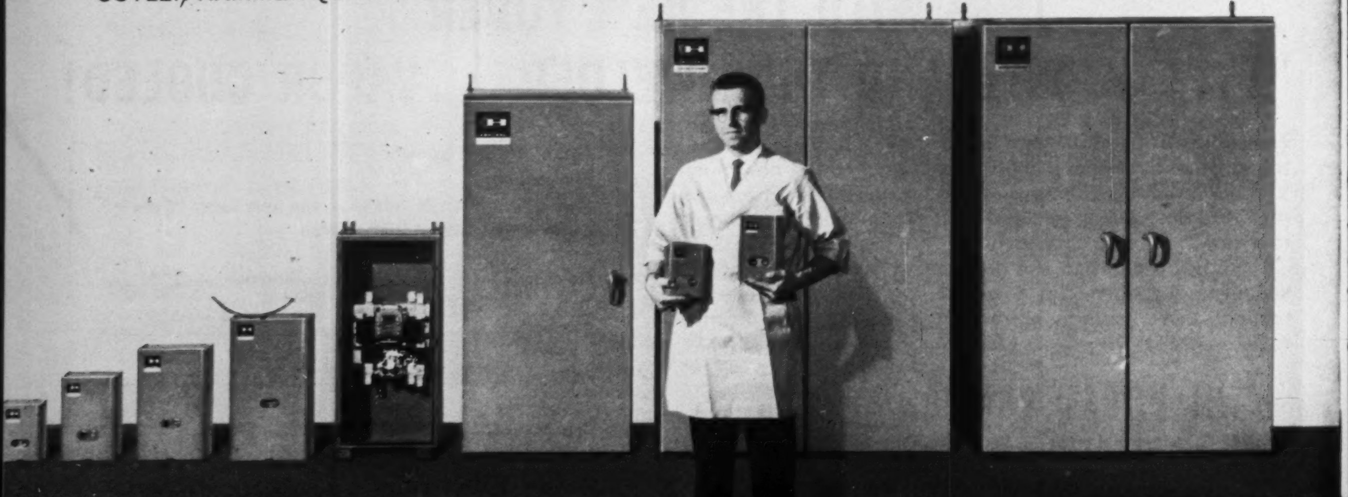


CONTROL

CUTLER-HAMMER MOTOR STARTERS

Still the proven standard of quality...always in stock for immediate delivery

Millions of satisfactory operations in thousands of applications have proved the unmatched quality of Cutler-Hammer across-the-line magnetic starters. That this line is still recognized as the leader—nine years after the original design was developed—is a great tribute to the years-ahead thinking of Cutler-Hammer engineers.

FIRST IN '53—STILL THE LEADER IN '61

Since the Three Star line was introduced in 1953, many improvements have been made; magnet coils that far exceed NEMA standards, for example. But many achievements of the original design—vertical, dust-free contacts; overload relays adjustable to within 3% of actual full-motor ratings; provision for 2 or 3-coil overload relays in the same enclosure—are features no other manufacturer has been able to improve. You can safely bet that when these pace-setting features are improved, it'll be another Cutler-Hammer development.

ALWAYS AVAILABLE FOR FAST DELIVERY

You'll find the smaller sizes of Cutler-Hammer Starters always in stock at your local distributors—larger sizes immediately available from the factory. We hope you'll make your own feature-by-feature comparison between the Cutler-Hammer line and any other starter on the market. Look especially carefully at such vital advantages as ease of installation, high interrupting capacity, coil construction and accessibility.

Regardless of what features you select as the criterion of superiority, we're sure you'll choose Cutler-Hammer after you've made your unbiased comparison.

If you're one of many companies being forced to stock two sets of parts because of design changes, now is an excellent time to standardize on Cutler-Hammer.

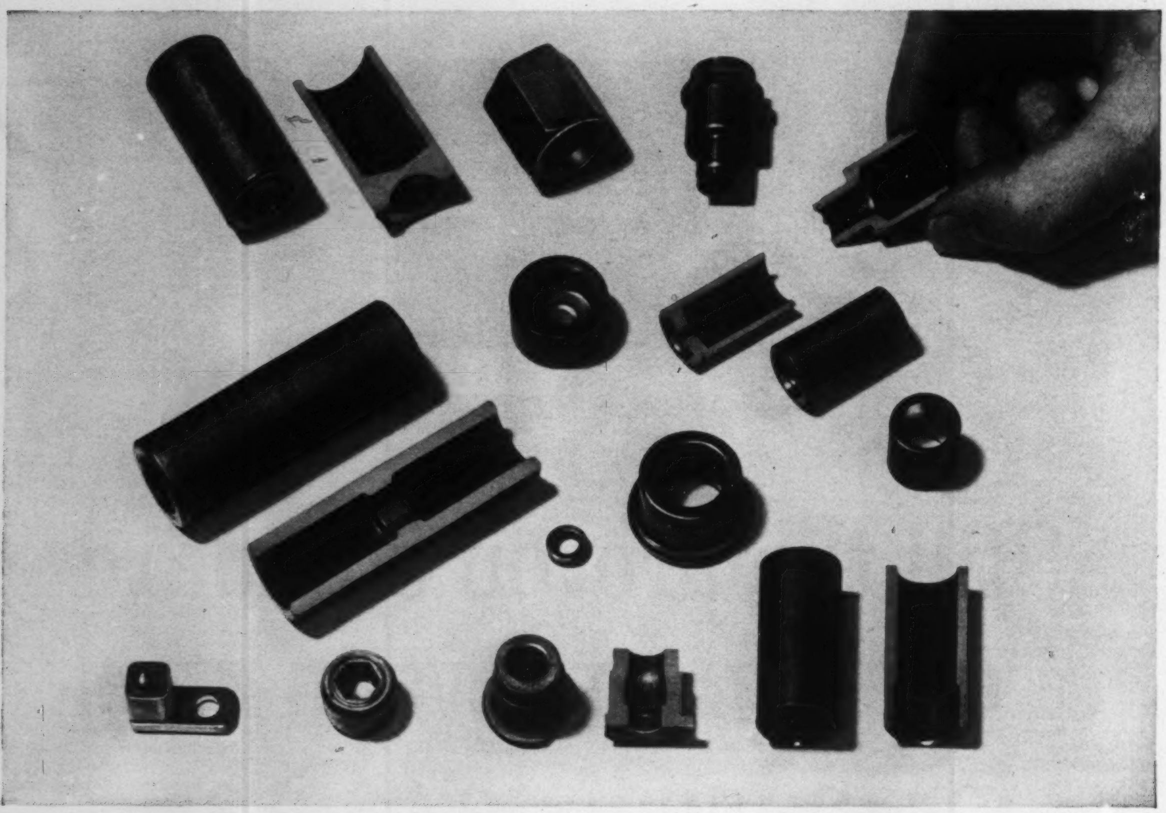
Call your distributor or local Cutler-Hammer Sales Office soon. Or write for Publication LO-70-S213.

WHAT'S NEW? ASK..

CUTLER-HAMMER

CONTROL

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. • Associates: Cutler-Hammer Canada, Ltd.; Cutler-Hammer Mexicana, S. A.



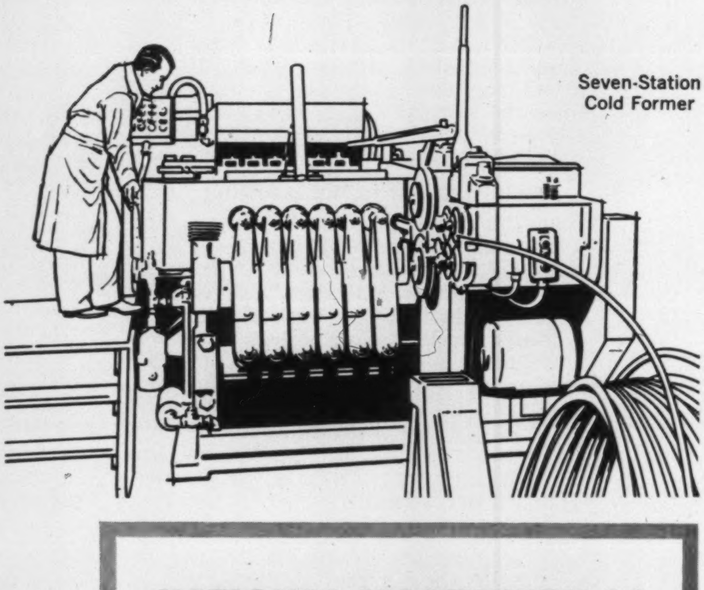
A New Look at Cold Forming!

The new National Seven-Station Cold Former now lets you make parts you had "shelved" as impractical. Six- and seven-station Cold Formers are routinely producing the formerly "impossible" jobs. Many are formed scrapless, most are practically finished, all are cold-formed automatically from coiled wire.

Production rates for these parts range from 45 to 115 *per minute!*

If you make odd-shaped parts, may we help you evaluate them for the potential that awaits you with these new Cold Formers? Come to Tiffin, witness our demonstrations and let's discuss your work.

No obligation.



Seven-Station
Cold Former

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BOLTMAKERS • NUT FORMERS • TAPPERS
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Induction Heat Treating
reduces production costs
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J-35000

how one simple change jumped production 105%

Look at the long slot that runs the length of this typewriter adapter shaft. It was giving Standard Register Co. a costly production headache. Tubing used could only be milled at 7½" per minute. Finish was poor. Warping and twisting ran rejects to 25%.

Then Ryerson studied the situation and suggested a change in material—to Ledloy® 170 tubing. Using the same tooling, Standard now mills 15½" per minute—more than double former production. And rejects dropped to zero—the slot is smooth and straight as a die. See for yourself.

How about you? Shouldn't you invite this kind of close look at the material in your products, equipment and plant? A Ryerson specialist may well help you boost production and cut costs in some ways you never thought of. Metalogics is like that.

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Metalworking Week®

September 4, 1961

How Betting Goes on Auto Labor

The odds are slightly in favor of a peaceful settlement in the auto dispute. Detroit observers are wagering that the Big Three and the United Auto Workers will sign, without profit sharing, if the producers sweeten their original offer. If a strike comes at the new deadline of 10 a.m., Sept. 6, the odds strongly favor a short walkout against General Motors Corp.

Romney Includes Salaried People

American Motors Corp. President George Romney will include the company's 4000 salaried people in a profit sharing plan similar to the one for hourly employees. The hourly plan provides that 5 per cent of gross profits (after provision for stockholders) will go in AMC stock held for each worker, with voting rights controlled by the company. Another 10 per cent goes into a "progress sharing" fund to pay all pension and insurance benefits for workers. If the present SUB funding plan sinks below the maximum position, progress dollars make up the difference. Any balance left in the progress fund could be split among workers, but it will probably go in a contingency fund. If profits are insufficient to pay benefits, the difference will come out of the annual improvement allowance employees receive.

AMC's Contribution Will Vary

If AMC's profit sharing plan had been in effect in the fiscal year ending Sept. 30, each worker would have received the equivalent of 3.2 cents per hour in stock, plus 6.4 cents in pensions, insurance, and SUB. But if it had been in effect during the more profitable fiscal 1960, the take would have amounted to 23.7 cents per worker per hour.

The Rambler Can Roll

The three year pact between AMC and the UAW will give the company a strikefree start on what it hopes will be a 500,000 unit sales year in 1962. Besides the profit sharing feature (predicted by STEEL, Jan. 2, p. 138), the contract provides: Higher pension benefits, supplemental pay for company scheduled, short workweeks (65 per cent of the difference between hours worked and 40 hours), more SUB (62 per cent of gross pay instead of 65 per cent of net and $40 maximum weekly benefits for a full year), fully paid insurance, no change in cost of living and annual improvement factors, and the inclusion of 12 of the present 17 cents in escalator pay into the basic wage.

Will GNP Hit $540 Billion Rate This Year?

Commerce Secretary Luther Hodges believes that gross national product could reach an annual rate of $540 billion by the end of the year. But he warns that the mark may not be realized if there is a strike in the auto industry. The upward revision of previous forecasts (a $530 billion rate) is based on the strength of the recovery, plus stepped up military spending due to the Berlin situation.

Economic Upturn Spurs Capital Spending

"If defense demands continue to expand, and if the American consumer expends a high proportion of his increasing income, the prospects for substantial recovery in plant and equipment spending are bright indeed," states Martin R. Gainsbrugh, chief economist, National Industrial Conference Board. Despite excess capacity and narrow profit margins in many industries, the pressure to modernize is intense.

Consumer Purchasing Expected to Improve

With high personal income and a good backlog of savings, consumers are likely to be spending at the rate of $346 billion by the fourth quarter, up $11 billion from the second quarter, says Raymond E. Danto Associates, Detroit. It adds: Disposable income is running at the $367 billion rate and may hit the $373 billion mark before the year ends.

NLRB Vetoes Superseniority Offer

An employer cannot grant extra seniority to workers who return to work during a strike or to replacements for strikers. During a strike by Local 613, International Union of Electrical Workers, against Erie Resistor Corp. in 1959, the company offered 20 years' seniority to replacements, laid off employees, and strikers who returned to work. But the National Labor Relations Board has ruled this an unfair labor practice, stating that it "divides the strikers against themselves."

Develops One-Piece Valve

W-K-M Div., ACF Industries Inc., has developed this one piece valve as a substitute for ball valves which often require many parts. A stainless steel ball is molded in a conical block of Teflon like the yolk within the white of a hard-boiled egg. The flow of gases and liquids is regulated by turning the ball which moves smoothly against the Teflon. The valve is shown in the open position.

Construction Continues at High Level

Construction contracts in July ($3.53 billion) held close to the high June level, F. W. Dodge Corp. reports. A 59 per cent increase in apartment building contracts spurred residential building 13 per cent above the year-ago level. The American Institute of Steel Construction says bookings of structural steel during the first seven months led the 1960 period by 3 per cent as a result of continued strength in commercial and public building construction. Industry bookings totaled 2,315,157 tons.

Consumer Price Index Reaches New Peak

The Labor Department's consumer price index rose 0.4 per cent from June to July, reaching a record 128.1 per cent of the 1947-49 average—the biggest monthly increase since October, 1960. It was influenced primarily by higher food prices. Two effects: Buying power of factory workers dropped about 0.5 per cent during the period. Now many of them will get cost-of-living increases.

Machine Tool Outlook: Restrained Optimism

New England machine tool builders evinced "restrained optimism" for 1961's last half and 1962 in a National Machine Tool Builders' Association survey. Still operating at about 50 per cent of capacity, the industry's net new orders in July dropped to $55,950,000, down $5.5 million from June. Shipments of cutting and forming tools fell from $64.2 million in June to $51.1 million in July.

Canadian, U. S. Economic Integration Urged

Sherwood H. Egbert, president, Studebaker-Packard Corp., urges the gradual reduction of some tariffs and a controlled integration of Canadian and U. S. economies. "The challenges of international trade and the Soviet challenge have brought the two nations even more firmly together, and the complementary and geographical nature of our trade make such an arrangement ideal." He recommends establishing an executive commission to study the idea and suggests a start be made in the auto industry.

Soviets Boast 250 Million Ton Ingot Output by 1980

Russia will produce 71 million tons of steel ingots this year, equaling the combined output of West Germany, France, the Benelux countries, and Italy, claims Tass News Agency. By 1980, Tass says that Soviet production will reach 250 million tons. Commerce Department figures tell a different story:

(Production, in millions of tons)

	1957	1958	1959	1960	(First 3 mo.) 1961
U. S.	112.7	85.3	93.4	99.3	19.7
W. Germany, France, Benelux, Italy	65.9	63.9	69.7	80.3	20.6
USSR	56.2	60.5	66.0	72.0	19.0
United Kingdom	24.3	21.9	22.6	27.2	7.0
Japan	13.9	13.4	18.3	24.4	6.8
Canada	5.0	4.3	5.9	5.8	1.5
Other Countries	38.1	40.0	44.9	46.5	11.8

Business Opportunities Abroad

Fonderie Pierre Pasquet & Cie, Dordogne, France, wants a license from a U. S. firm to produce rolling mills, presses, and machine tools . . . Societe Francaise des Metaux et Alliages Blancs, Saint-Denis (Seine), France, hopes to expand its line of nonferrous metals to include U. S. products . . . N. V. Nederlandse Industriele en Handelsonderneming van L. Valkenborgh, The Hague, Netherlands, is seeking a license from a U. S. firm to produce sound

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The Metalworking Weekly

September 4, 1961 Vol. 149 No. 10

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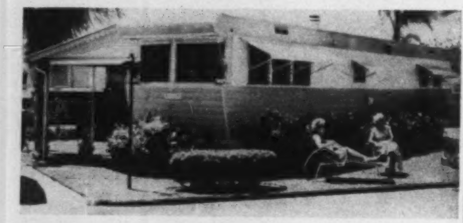
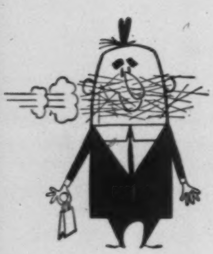
resistant, steel ceilings . . . Seton Creaghe Ltd., London, wants licensing rights to produce U. S. electromechanical test and control equipment . . . M. S. McLeod Ltd., Adelaide, Australia, seeks rights to produce steel, prefabricated houses in Australia . . . Khwaja Abdur Rahim of West Pakistan wants to discuss joint ventures in his country with U. S. metalworkers. He will be at 1785 Massachusetts Ave. N. W., Washington (c/o Vincent W. Allin Committee), until Oct. 3.

Mobile Home Industry Take Note



The mobile home industry may get a major boost from the armed forces. The Senate Appropriations Committee has urged the Department of Defense to provide parking facilities for trailer homes wherever feasible. It recommended a $977,000 appropriation to the Air Force for the establishment of trailer courts at nine bases. The committee would monitor the program to determine its use by other services.

Straws in the Wind



NCO Consulting Service's outlook for distributors of electronic parts: A 12 per cent gain in industrial business this year . . . Defense spending will continue on a strong uptrend, says Prentice-Hall Inc., may hit 10 per cent of gross national product by mid-1962 . . . A Chase Manhattan Bank study concludes that Britain's membership in the Common Market and the prospects of greater competition for its home market could force the investments and reforms needed to stimulate the country's growth . . . The Windsor middle series will be dropped from the 1962 Chrysler line and replaced with a sports car . . . Ford officials say auto sales will reach "boom levels" in the fourth quarter and provide the springboard for near-record sales next year . . . Amperex Electronic Corp. has cut prices of Amperex PADT transistors 50 per cent to attract new mass markets . . . Norton International Inc. made 8 per cent increases on export prices of machinery built by Norton Co. and domestic prices of Gould & Eberhardt Div.

Metalworking Pulse

The Business Trend: The first sizable jump in 1962 model auto production and the continued rise in steel output pushed STEEL's industrial production index up to a preliminary 166 (1947-49=100), the highest point in five weeks. **Autos:** With all but a few of motordom's 47 assembly plants heading for volume production of '62 models, output passed 100,000 units for the first time in six weeks. **Steel:** Ingot output rose to the highest point in 15 months.

• INDUSTRIAL PRODUCTION INDEX (1947-49 = 100)	
Week ended Aug. 26	166†
Year ago	145
• PASSENGER CAR OUTPUT (UNITS)	
Week ended Sept. 2	120,000*
Year ago	51,647
• STEEL INGOT OUTPUT (TONS)	
Week ended Sept. 2	2,100,000*
Week ago	2,020,000

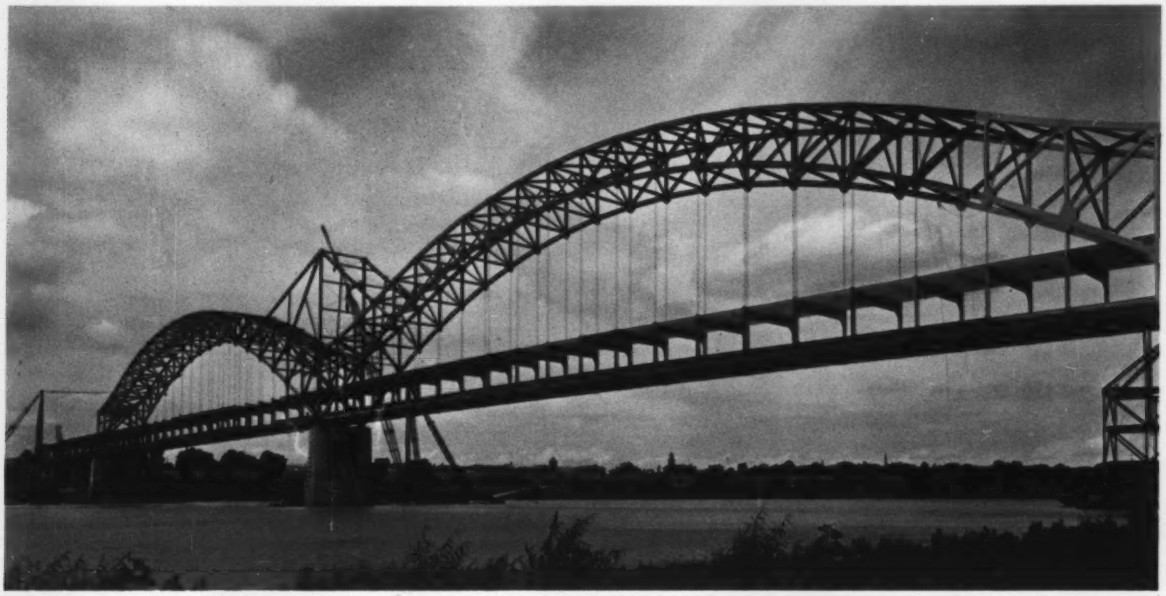
Details on Page 126

†Preliminary. *Estimated.

USS DESIGN STEELS cut weight, save money in Louisville-New Albany Bridge

This mark tells you a product is made of modern, dependable Steel.

Louisville-New Albany Bridge was designed by Hazelet & Erdal, Consulting Engineers, Louisville, Kentucky, for the State Highway Department of Indiana and Kentucky Department of Highways. Fabricator: The R. C. Mahon Co., Detroit, Michigan. Erector: John F. Beasley Construction Co., Dallas, Texas (Sub-contractor to Mahon).



Scheduled for completion late in 1961 is this new double-deck, two-span, tied-arch bridge spanning the Ohio River between Louisville, Kentucky, and New Albany, Indiana. It is another fine example of the application of heat-treated constructional alloy steel, high-strength low-alloy and structural carbon steels to provide the desired strength at least weight and lowest cost. A total of 7,641 tons of steel was used in the two 800-foot spans and approaches.

Because much of this bridge was shop welded, the excellent welding properties of USS Design Steels played an important part in their selection. The weldable, constructional alloy USS "T-1" and high strength TRI-TEN Steels both permitted design engineers to reduce the amount of steel needed, resulting in a substantial reduction in the total cost. The reduction in dead weight enabled further savings by reduced loads on individual truss members, piers, and foundations.

All of the tie chords and most of the highly stressed upper and lower chords and some verticals were made of 100,000 psi yield strength heat-treated constructional alloy steel. Approximately 1,500 tons of USS "T-1" Steel were used.

Most of the diagonals, some of the top and bottom chords and approach trusses called for 50,000 psi high-strength low-alloy ASTM A242 steel. USS TRI-TEN Steel—1,535 tons of it—was used for these applications. (USS TRI-TEN Steel can also meet ASTM A441.)

United States Steel also furnished 1,100 tons of ASTM A373 and 1,550 tons of ASTM A7 structural carbon steel, used in the lesser stressed members of the bridge and approaches.

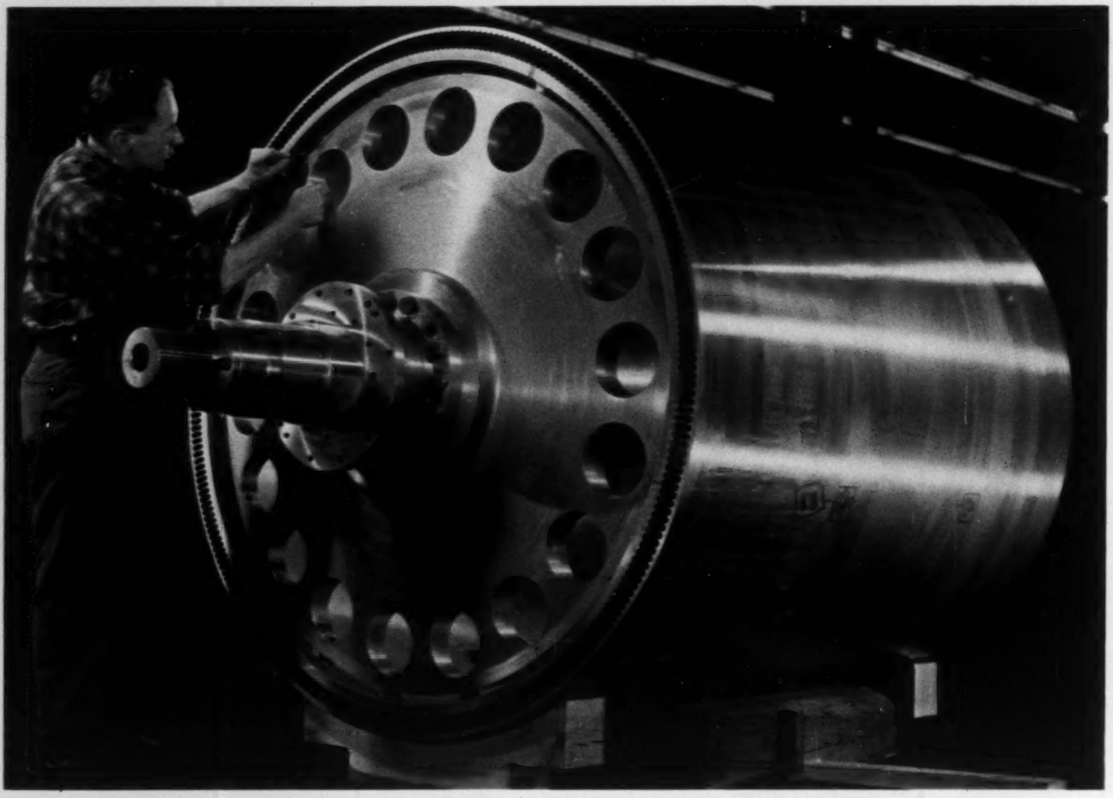
For more information on any of these USS Design Steels, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. USS, "T-1," COR-TEN, TRI-TEN, and MAN-TEN are registered trademarks

United States Steel Corporation • Columbia-Geneva Steel Division • National Tube Division • Tennessee Coal and Iron Division • United States Steel Supply Division United States Steel Export Company

USS Steels for bridge design	**PSI Min. yield**
Structural Carbon Steel (A373)	32,000
Structural Carbon Steel (A7)	33,000
Structural Carbon Steel (A36)	36,000
USS COR-TEN High Strength Steel	50,000
USS MAN-TEN (A440) High Strength Steel	50,000
USS TRI-TEN (A441) High Strength Steel	50,000
USS "T-1" Constructional Alloy Steel	100,000
USS "T-1" Type A Constructional Alloy Steel	100,000

USS United States Steel

Rough-machined ring and forged ring being sawed at our Homestead Works. ▶
Three-ring rotor, showing rectangular holes through ring wall, with end plates and tubular spindle assembled into a unit ready to ship.



How to bring a missile back through temperatures to 8,500°F

You can broil a steak at 350°F. Pure iron melts at 2795°F. Most meteorites burn up when they enter the earth's dense atmosphere. Today, man is firing missiles to meteoric altitudes—but the problems of tolerating the extreme temperatures of re-entry have been the greatest challenge to his ingenuity.

One of the major obstacles to simulating re-entry conditions was how to produce for realistic time durations pure air in large volumes at meaningful temperatures, pressures and velocities. This problem is being solved with the *Wave Superheater*—an innovation in hypersonic wind tunnels. Temperatures to 8500°F, pressures to 200 atmospheres and velocities up to Mach 15 can be attained with this facility. Cornell Aeronautical Laboratory has devised this equipment to test full-scale missile components in the laboratory.

The wave superheater is essentially a blow down system using a rotor with 288 tubes (passages) drilled into its periphery. The shock tubes are charged with air; then a driver gas (helium) at a pressure of 1500 psi is released through one end of each tube, successively superheating by shock waves the air which is then collected and expanded into the wind tunnel. The rotor operates at a maximum temperature of 800°F; each tube is momentarily cooled as it rotates, to be ready for the next charge.

Rotor Ring Forgings. The heart of the superheater is the rotor made from three USS Stainless W forgings. The rough-machined rings are each 63″ OD, 54″ ID, 23½″ long and weigh 6,000 pounds each. USS Stainless W was chosen for this demanding application because of its precipitation hardening characteristics, and its ability to retain the required high strength at the operating temperature.

The three rings were obtained from a 59″ diameter ingot, which was cogged, sheared, upset-forged, punched and finally mandrel-forged under our 10,000-ton press. After rough machining and completing the inspections called for, the rings were shipped to 20th Century Machine Tool Company, Utica, Michigan, who drilled and broached the holes seen in the assembled view of the three-ring rotor. With an assist by Hoover Tool & Die Company, Warren, Michigan, the final machining and assembly was completed in 10 months.

No matter what kind or size of USS Quality Forgings you need, you get the advantages of the finest steel, the most modern equipment and the most skilled forging men in the world. Address inquiries to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. A copy of our booklet "USS Nuclear Forgings" may be secured by writing to the same address. USS is a registered trademark.

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USS TRADEMARK **United States Steel**

5555-2

Send for new movie,
"How to Weld USS 'T-1' Steels"

This new 18-minute, 16mm color motion picture shows concisely the practices involved in welding USS "T-1" Steels. If you are fabricating "T-1" Steel in your shop, this film and copies of the booklet will be a big help in demonstrating the proper technique to your welders. Fill out the coupon below and indicate the number of booklets you will need.

Included in the booklet is a handy welding heat-input calculator that helps a welder choose the proper welding machine settings. The film, together with the booklet, will help every welder to weld USS "T-1" Steels readily and successfully.

We'll gladly lend you the film and furnish enough free copies of the booklet and heat-input calculator for your shop personnel. USS and "T-1" are registered trademarks.

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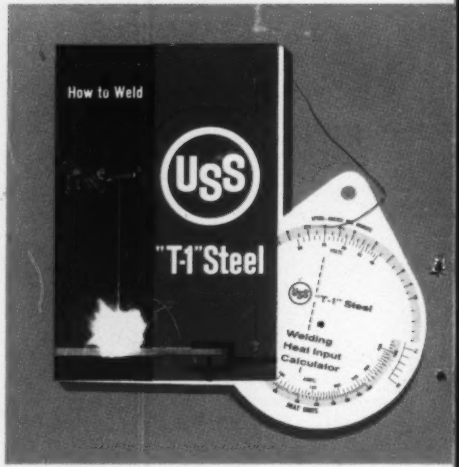


United States Steel
525 William Penn Place
Pittsburgh 30, Pennsylvania

Gentlemen:

Please lend me your 16mm color, sound movie, "How to Weld USS 'T-1' Steels." Also, send me______booklets of the same title. I understand there is no obligation.

Name____________________

Title____________________

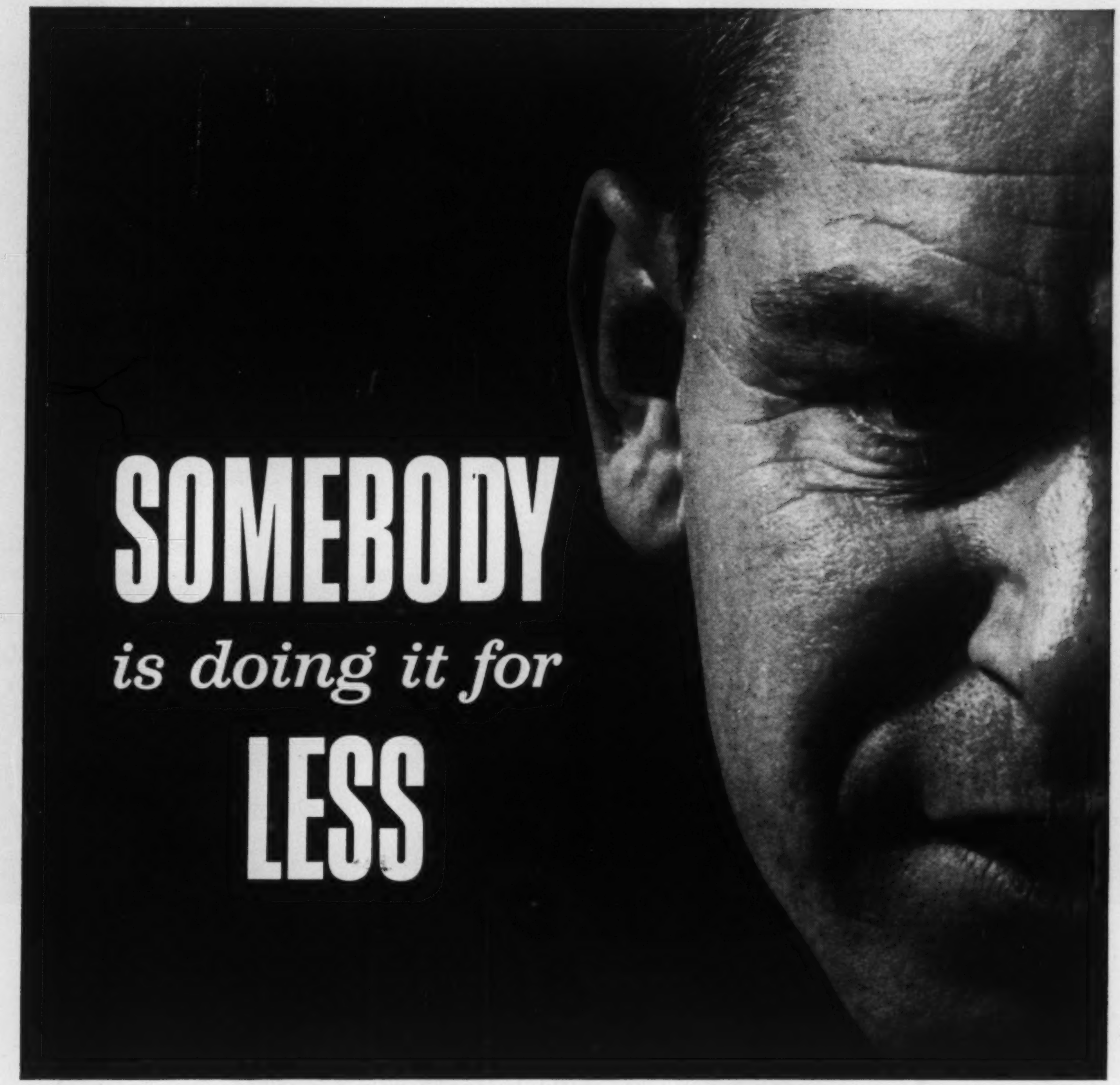
Company____________________

Address____________________

City____________ **Zone**______ **State**________

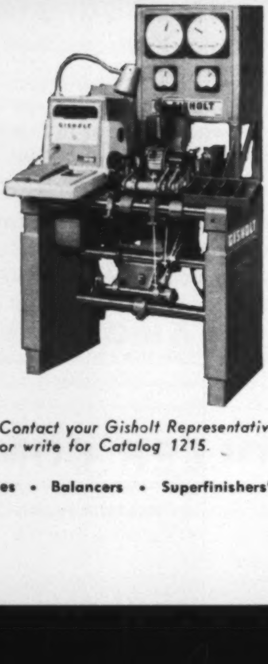
United States Steel

USS



Gisholt MASTERLINE® 1S Balancer—Shown with separate unbalance location (angle) and amount meters for each correction plane. Readings hold until corrections are made. Offers complete plane separation—needs no special foundation—correction planes can be inside or outside work supports.

New HS line handles miniature, high-speed parts—impellers, armatures, gyros, self-driven assemblies.



Contact your Gisholt Representative, or write for Catalog 1215.

How long since you analyzed your balancing methods in light of recent developments?

One year? Two years? Take a fresh look. If you still rely on operator skill or judgment, accuracy suffers, time is lost, reject rates or field failures are high.

With Gisholt balancers, guesswork is eliminated. You can locate, measure, correct and inspect in *one handling.*

Only Gisholt offers all the advantages you need to do it for less.

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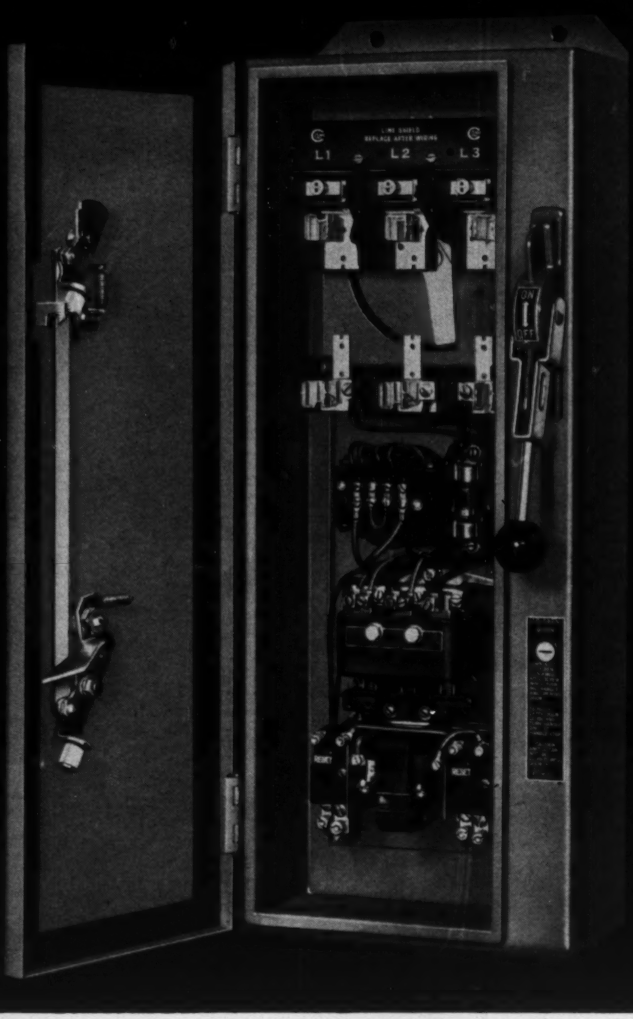
MACHINE COMPANY
Madison 10, Wisconsin, U.S.A.

Turret Lathes • Automatic Lathes • Balancers • Superfinishers® • Threading Lathes • Factory-Rebuilt Machines with New-Machine Guarantee

NEW
FROM CLARK
NEMA 12 SAFETY COMBINATION STARTERS WITH THREE EXCLUSIVE FEATURES



Safety fusible combination starters are gaining wide interest throughout industry. But only the new Clark line offers these important features:

- *New Clark-built visible blade disconnect switch with double-break, silver-alloy to silver-alloy contact surfaces*
- *Disconnect switch accommodates NEC or the new Class J Current Limiting fuses*
- *To simplify installation, complete unit can be removed from enclosure in seconds with no disassembly of handle mechanism*

New Clark Safety Starters offer non-teaseable, snap-action disconnect switch operation. Cabinet design permits only authorized persons to open door when switch is on, or to close switch when the door is open. Dust-tight operation is assured by interlock which requires door handle to be closed and door tightly latched before disconnect switch is operable.

These Clark Safety Fusible Combination Starters are available with interchangeable fuse clips to accommodate a full range of fuses, and are offered with famous Clark "CY" Contactors in sizes 0, 1, and 2. Designed for NEMA 12 (industrial) service, they also are suitable for NEMA 5 (dust-tight) applications. For information, call the nearest Clark distributor or sales office, or write: 61SCS1

THE CLARK CONTROLLER COMPANY

MAIN PLANT: CLEVELAND, 10 • **WESTERN PLANT:** LOS ANGELES, 58
IN CANADA: CANADIAN CONTROLLERS, LIMITED, TORONTO, ONT.

What good steel rolls are made of Proper ingredients, modern facilities, experienced people and quality control . . . this is what steel rolls are made of at National Roll. They start with the careful selection of the correct steel analysis to suit your application. Then, men like Works Manager Jack Russell, pictured above, carefully control the quality of your rolls from electric furnace melt to turning and grinding. Why not see for yourself what good rolls are made of at National—whether steel, iron or nodular iron. A look at our facilities and a talk with our people will show you why . . . NATIONAL'S THE GROWING NAME IN ROLLS.

NATIONAL ROLL & FOUNDRY DIVISION
GENERAL STEEL INDUSTRIES, INC., Avonmore, Pennsylvania
General Steel Industries, Inc., General Offices: Granite City, Ill. Plants: Granite City, Ill., Eddystone, Pa., Avonmore, Pa.
Subsidiary: St. Louis Car Company, St. Louis, Mo.

ACME STEEL MACHINES STRAP CIRCLES AROUND ANY OTHER METHOD

In the slit coil field alone, dozens of producers are proving that Acme Steel automatic strapping systems are the most productive partner slitting equipment ever had. For instance, the new F4 Strapping Machine and Indexing Table (at left) let one man completely strap as many as 150 coils *of any width* per hour—all through push-button control. And once secured, coils are unitized just as efficiently with Acme Steel portable powered strapping tools.

Thanks to this rapid, non-stop flow, existing slitting equipment can run *continuously* at full capacity, eliminating the need for investing in additional slitting lines in many instances. No wonder Acme Steel automatic strapping equipment can pay off in 18 months!

No field has a monopoly on these savings. Acme Steel equipment is scoring unparalleled productivity gains in strapping giant hot coils, paper, textiles, products and packages of every description . . . in bundling and unitizing such products as lumber, building materials, bar stock, pipe and sheet metals.

Full facts on industry's most proven and productive strapping systems are as close as your phone. Call your Acme Idea Man for an evaluation of your particular operation. Or, clip the coupon for case studies.

ACME STEEL IDEA LEADER IN **STRAPPING**

ACME STEEL COMPANY
Dept. SBS-91, 135th & Perry Ave.
Chicago 27, Ill.

Please send me detailed information illustrating how major companies in my field use Acme Steel Strapping.

*Name*____________________
*Title*____________________
*Firm*____________________
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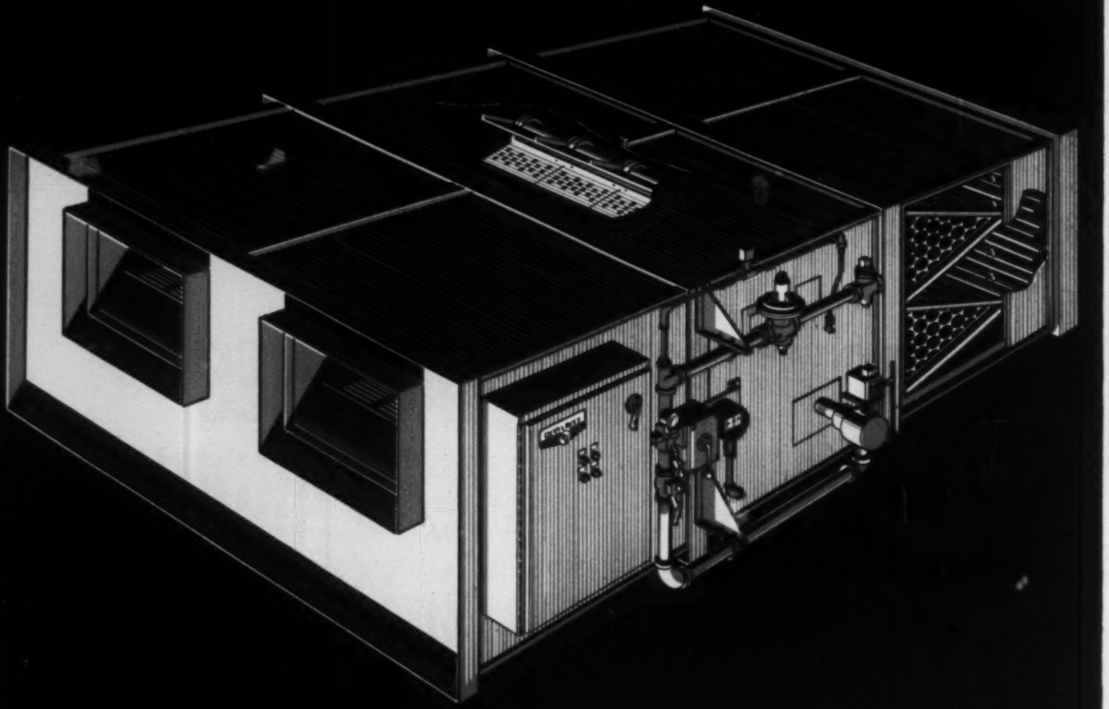
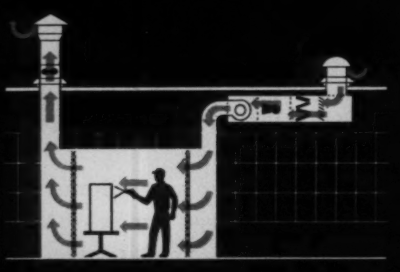
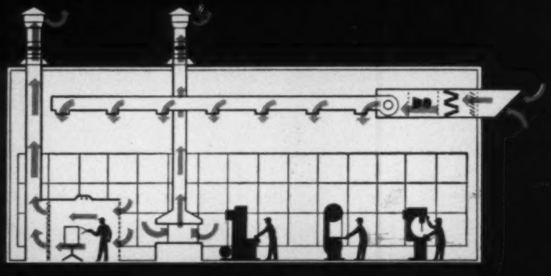




AIR-REPLACEMENT UNIT PROVIDES DUST AND TEMPERATURE CONTROL FOR TOTALLY ENCLOSED SPRAY BOOTH.



AIR-REPLACEMENT UNIT PROVIDES FILTERED AND TEMPERED MAKE-UP AIR FOR GENERAL SHOP AREA.

make-up air units from DeVilbiss provide effective air balance in your plant. They replace tempered air exhausted from spray booths, ovens, parts washers, dust collectors, plating and welding areas. You have better ventilation, less heat load on your central heating system. Exhaust systems work better. A package unit is your answer for volumes up to 40,000 CFM. For larger needs we can custom-design a system to meet your climate and plant conditions.

Talk to DeVilbiss about all your plant air-replacement requirements

FOR TOTAL SERVICE, CALL

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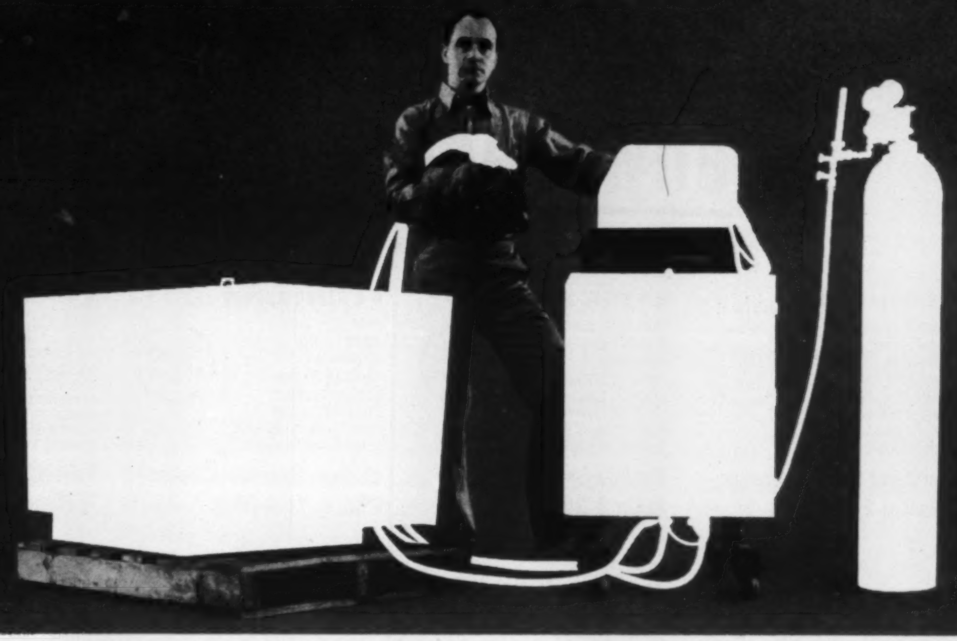
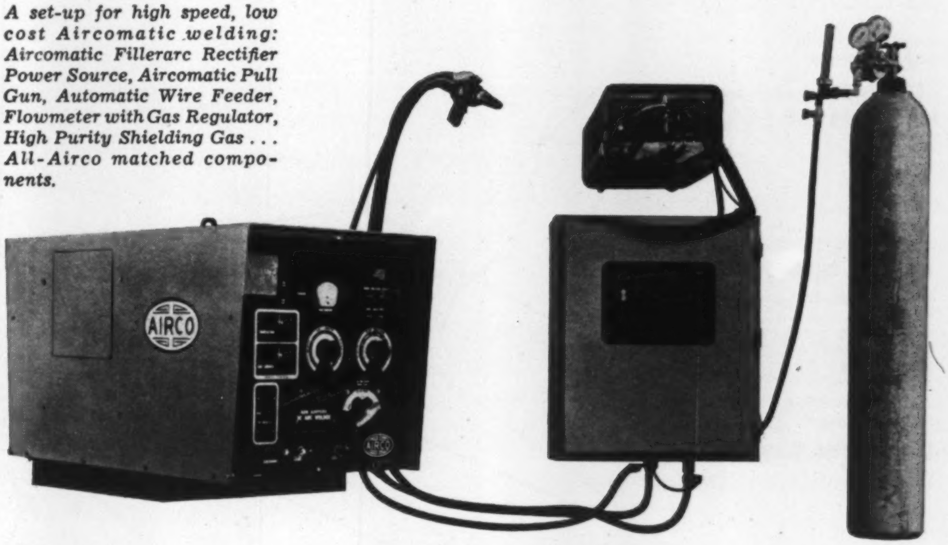
THE DeVILBISS COMPANY, Toledo 1, Ohio. Also Barrie, Ontario; London, England; São Paulo, Brazil. Branch offices in principal cities.

WHEN YOU USE GAS-SHIELDED METAL ARC WELDING



ONLY THE AIRCOMATIC® LINE GIVES YOU EVERYTHING YOU NEED

A set-up for high speed, low cost Aircomatic welding: Aircomatic Fillerarc Rectifier Power Source, Aircomatic Pull Gun, Automatic Wire Feeder, Flowmeter with Gas Regulator, High Purity Shielding Gas . . . All-Airco matched components.



Aiming to weld jet engines? . . . Rock crushers? . . . Whole trains of aluminum gondola cars? . . . Auto body frames? . . . mild steel, stainless, copper alloys or metals of the future?

Do it the Aircomatic way! You can weld it up to 7 times faster, and still turn out top quality welds!

How is this possible? Airco's range of equipment is unequalled anywhere. As a result you get matched components which fit precisely the specialized demands of your job.

Specifics: The Airco Pull Gun handles small diameter wires with the highest precision of all semi-automatics. The Aircomatic Wire Feeder gives you the finest wire feed speed control. The Aircomatic Fillerarc Rectifier gives you the ultimate in versatility and performance.

For top dollar savings in fabrication here's the No. 1 line in the gas shielded metal arc welding business. Call Airco . . . where the big idea is teamed with unexcelled experience!

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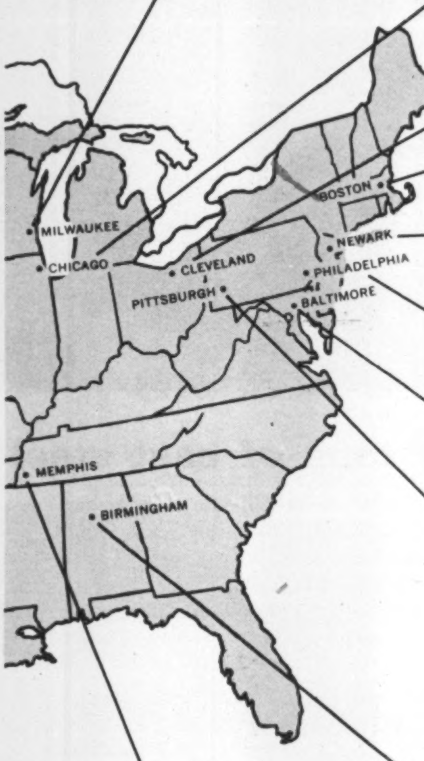

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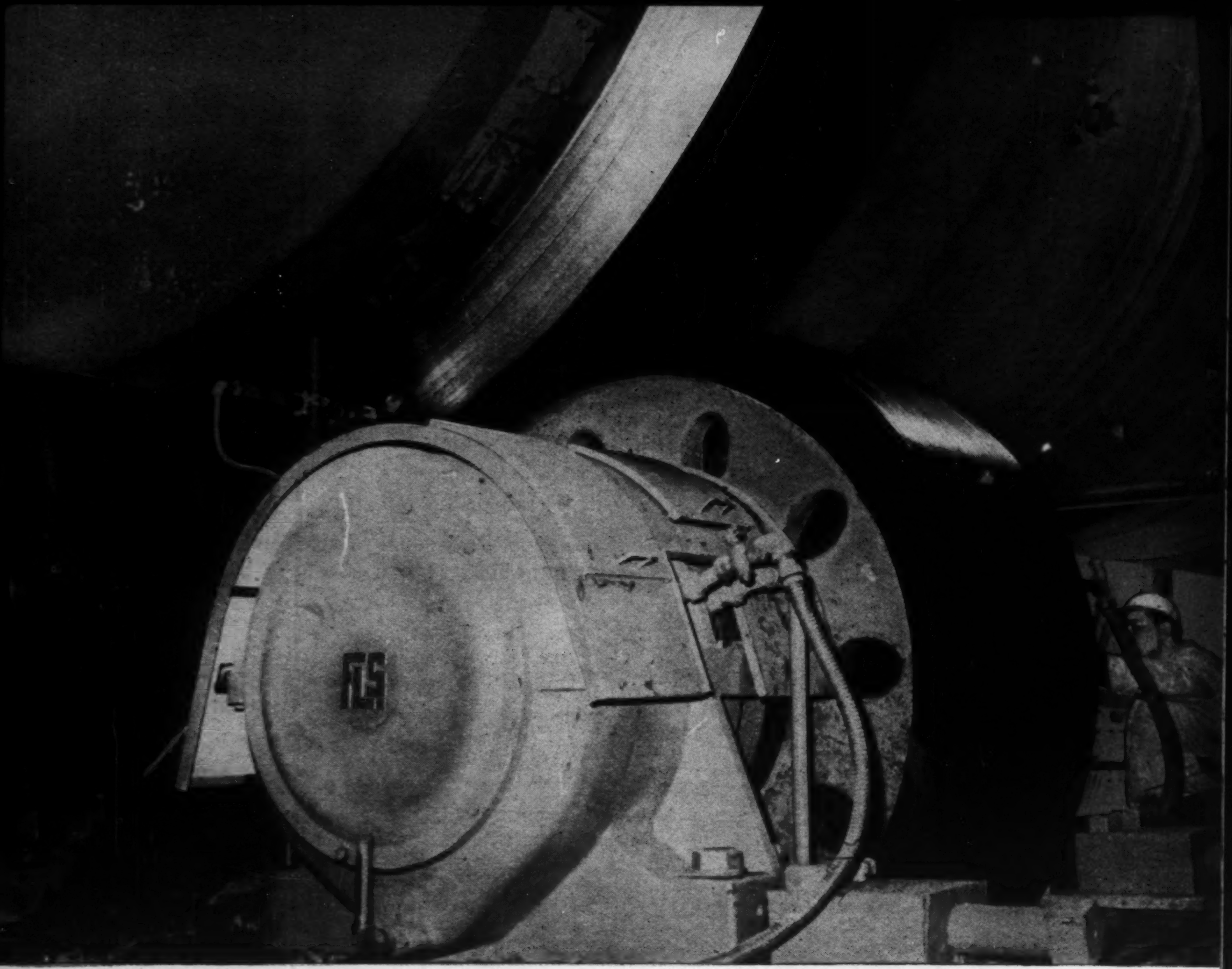


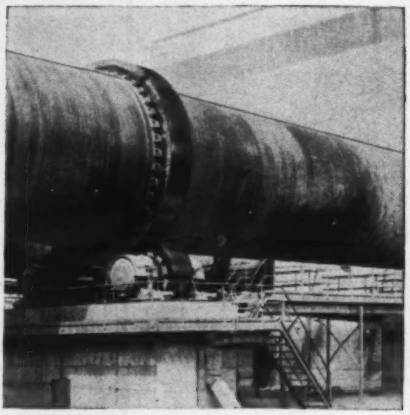
HOW BIG IS A MAN... against 89 tons of cast steel?

These mammoth 89 ton steel tire, kiln supporting and thrust roller assemblies were cast in the foundries of Erie Forge & Steel Corporation. They bear the weight and facilitate the operation of the largest rotary cement kilns in America. The distance between the tire and roller assemblies on each rotary kiln is 100 feet. Cast steel tires are over 20 feet in diameter, weigh 60 tons each. Thrust rollers weigh 6¼ tons each and kiln supporting rollers 22½ tons each.

Each of these two giant kilns produces over 8000 barrels of cement daily with ease in the Dundee Cement Company plant at Dundee, Michigan

By comparative size the man is small—but men made these steel behemoths and men run them. The men of Erie Forge & Steel Corporation welcome the challenge to furnish steel castings and forgings, from pounds to tons, for the diverse machines of industry.

Submit your cast or forged steel component requirements to us with full confidence.



Photographs are by courtesy of F. L. Smidth & Company, designers and builders of "The Largest Rotary Cement Kilns in America."

ERIE FORGE & STEEL CORPORATION

ERIE, PENNSYLVANIA

3M Abrasives Cut Costs of Steel Utensil Finishing

Nationally famous, "Ekcoware" cooking utensils are manufactured here in the housewares division of Ekco Products, Inc., Massillon, Ohio. Prior to color buffing, these copper-clad stainless steel pans are given a final polishing.

Abrasives Ekco formerly used for this final finishing required a considerable amount of "break-in" time and caused many pan rejects.

Now, thanks to a 3M Representative's suggestion, Ekco has switched to 3M "PG" Wheels. The results have been remarkable. "PG" wheels have upped production 20%, eliminated one handling operation, reduced rejects, and produced a better finish on the pans. There's no "break-in" period either, as 3M "PG" Wheels maintain an even cut from installation to throw-away point.

Why not let 3M's new Cost Check 5-4-5 Program help you to effectively investigate ways to lower costs and increase production. Discover:

- If your grinding can be done more economically
- If your finishing is as efficient as possible
- If your polishing can be done faster and better

Send today for a free Cost Check 5-4-5 Review Form without obligation. Put 3M's years of abrasive know-how at your disposal.

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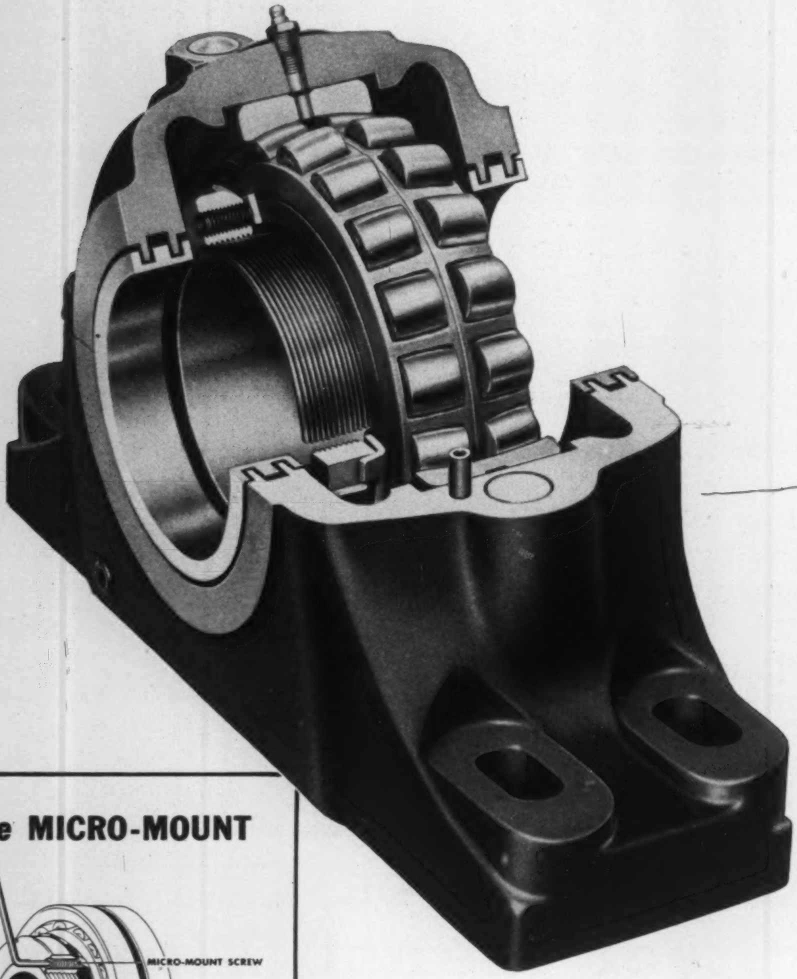
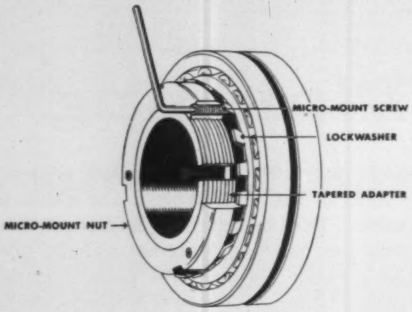


Exclusive MICRO-MOUNT



Fast and accurate mounting is made possible by the new Dodge Micro-Mount. The Adapter is snugged up with the Micro-Mount Nut. Mounting is completed by turning the Micro-Mount Screws against the Lockwasher until bearing, adapter and shaft form an integral unit.

Spher-Align

SPHERICAL ROLLER BEARING PILLOW BLOCK

Dodge, the nation's leading supplier of mounted bearings, presents America's newest spherical roller bearing pillow block . . . a rugged bearing in attractive modern design . . . inherently self-aligning . . . easy to install . . . easy to maintain . . . and featuring the unique Micro-Mount.

Its rugged housing of close-grained semisteel withstands shock loads. It has a generous lubrication reservoir—for oil or grease. And standardized dimensions make Spher-Align interchangeable with all other similar units.

Expansion and non-expansion types. Stocked for 2⁷⁄₁₆″ to 8″ shafts. Call your Dodge Distributor—or write us.

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CALL THE TRANSMISSIONEER — your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look under "Dodge Transmissioneer" in the white pages of your telephone directory, or in the yellow pages under "Power Transmission Equipment."

NEW
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NEW

F 60-24
6,000-lb capacity

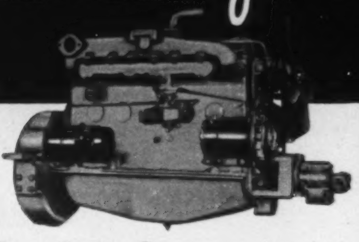
F 70-24
7,000-lb capacity

F 80-24
8,000-lb capacity

F 100-24
10,000-lb capacity

Special-Purpose trucks with high underclearance, FS60 —6,000-lb, FS70 — 7,000-lb, FS80 — 8,000-lb capacity.

NEW Allis-Chalmers Lift Trucks Give You *more for your money!*



Power-Crater engine 6 cylinders

NEW POWER

Allis-Chalmers' OWN — Power-Crater engine is engineered specifically for Allis-Chalmers lift trucks. Has unique crater-shaped combustion chamber that sets up violent swirling turbulence for thorough mixture of air and fuel, resulting in responsive power and maximum fuel economy.

NEW MASTS AND FORKS

Sturdy steel channels move easily over bearing-mounted load rollers. • New piston-type cylinder with patented, self-adjusting packing minimizes maintenance. • New forks have rounded ends and long taper for easy entry under loads. Forks are easily spaced with new spring-loaded latch.

Have Your Allis-Chalmers Dealer Show You the Many Advantages of "F" Series Lift Trucks

Unusual grade-climbing ability due to power, balance and weight distribution. • Familiar, automotive-type controls—wide, adjustable seat—unobstructed floor board. • Easy, quick, maintenance accessibility. • Optional transmissions—constant-mesh, two-speed or Power-Shift torque converter drive. • Versatility of masts, carriages, forks and attachments.

For further information,
write for New Bulletin BU-680.
Allis-Chalmers, Milwaukee 1, Wisconsin.

BH-177

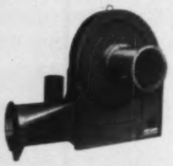
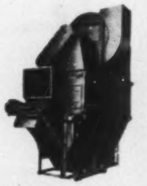
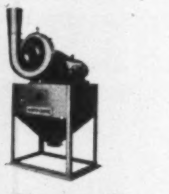
POWER-CRATER is an Allis-Chalmers trademark.

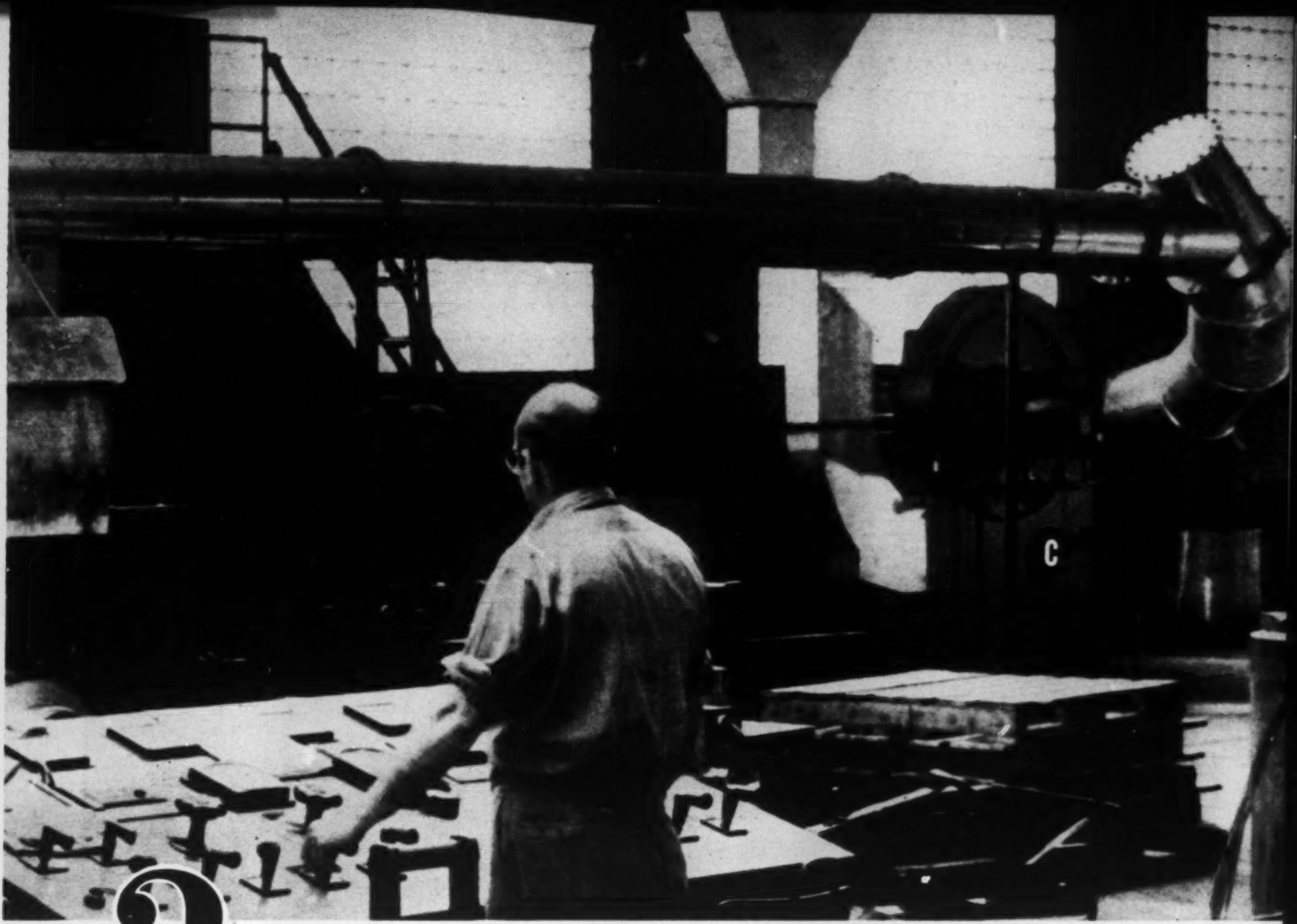
ALLIS-CHALMERS

Compare and You'll Choose Allis-Chalmers

A view in the West Plant of Scovill Manufacturing Company, Waterbury, Connecticut, showing Type W ROTO-CLONE application on oil mist. Exhaust hoods (A and B) on either side of mill stand are connected to Type W (C) at far right.

3 different dust problems here;

PROBLEM	*Oil Mist*	*Buffing Dust*	*Grinding Dust*
SOLUTION	 *Type W Roto-Clone*	 *Type N Roto-Clone*	 *Type D Roto-Clone*



3 different solutions by AAF

Oil mist, buffing dust, grinding dust all "knuckle under" to AAF ROTO-CLONES

Oil mist was just one of the dust problems at the Waterbury, Connecticut plant of Scovill Manufacturing Company. Automatic buffing and toolroom grinding operations also were producers of unwanted dust. Though the problems were tough, they were no match for the rugged ROTO-CLONE team thrown against them by AAF.

Oil mist was eliminated by the wet-collecting Type W ROTO-CLONE, which utilizes water sprays to extend the effectiveness of its dynamic forces to collection of the finest and lightest particles. Buffing dust fell before the Type N, also a wet collector. Its high efficiency results from the combined action of centrifugal force and the thorough intermixing of water and dust-laden air. AAF's dry-collecting ROTO-CLONE—the Type D—was a natural for toolroom grinding dust. It draws in dust-laden air, delivers the dust to the hopper, and exhausts clean air.

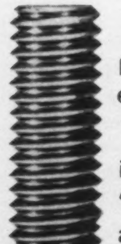
All three ROTO-CLONES offer (1) small space requirement, (2) maintained performance over a wide range of operating conditions, (3) constant exhaust volume, and (4) high collection efficiency. For information on complete line of AAF dust control equipment, call your AAF representative or write for Bulletin 271. Address: Robert Moore, American Air Filter Co., Inc., 443 Central Ave., Louisville, Ky.

AAF American Air Filter

BETTER AIR IS OUR BUSINESS

NELSON NS-10

THIS IS NELSON® STUD WELDING



Fast and dependable. That's the Nelson Stud Welding method of fastening to steel or aluminum. In a split-second, with the squeeze of a trigger, a rugged, secure stud attachment is made. You eliminate costly drilling/tapping and hand welding.

Savings of 60% or more in direct fastening costs have been made with Nelson Stud Welding. Tooling costs are often reduced. There's less material handling—the tool is taken to the work. The possibility of leaks in water and oil-tight units is eliminated. Product design can often be simplified.

Application ideas, design data and full method information is in the Nelson "Design Manual." Send for a copy today. **NELSON STUD WELDING**, Division of Gregory Industries, Inc., Department S, Lorain, Ohio.

GREGORY
INDUSTRIES

Duration of a first impression

Stainless steel has its own beauty secret. What meets the eye today will be unchanged 20 or 30 years from now, the finish still flawless, unmarked by wear or corrosive air. Unlike some architectural metals with beauty that is only skin deep, stainless will last indefinitely—with little or no maintenance.

Time-tested, consistent product performance like this comes from consistent quality materials—and J&L leads the stainless steel industry in melt shop standards, the point where quality starts. That is why J & L stainless, in a variety of finishes, is widely used in all types of buildings, inside and outside, wherever a first impression—and a lasting impression—is important.

Your J & L distributor can provide the technical assistance and the consistent quality stainless steel you need, backed by the consulting services of J & L's architectural department.

Stainless Steel

Jones & Laughlin Steel Corporation

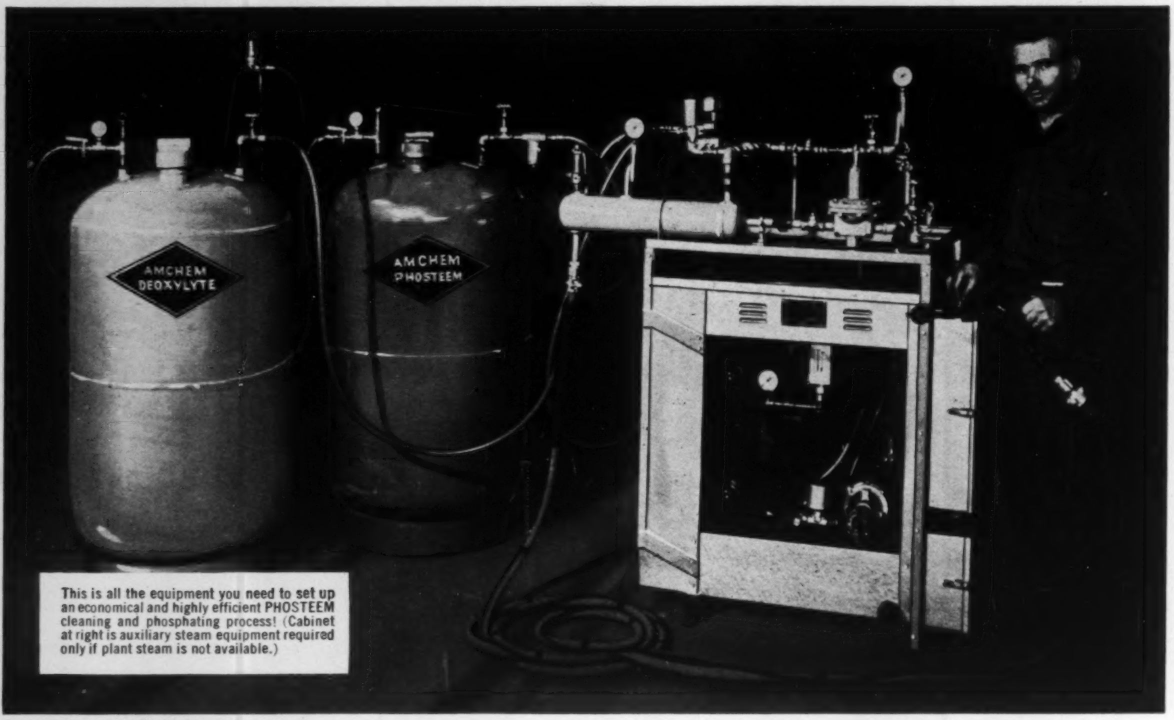
STAINLESS and STRIP DIVISION · BOX 4606 · DETROIT 34 · MICHIGAN

J L

STAINLESS

SHEET · STRIP · BAR · WIRE

Put a complete cleaning-phosphating department in your plant at a fraction of the cost and space of standard systems! AMCHEM PHOSTEEM*



This is all the equipment you need to set up an economical and highly efficient PHOSTEEM cleaning and phosphating process! (Cabinet at right is auxiliary steam equipment required only if plant steam is not available.)

Photo courtesy of the Electro Steam Generator Co.

QUALITY COATING—
the PHOSTEEM process cleans and phosphatizes metal surfaces simultaneously, even provides a final acidulated rinse, closely duplicating the quality obtained with conventional power spray washers. It increases corrosion resistance, adds paint bonding durability to any size or shape of virtually any metal alloy product . . . with coating uniformity far superior to hand and conventional steam cleaning.

MINIMUM REQUIREMENTS—
you can install a PHOSTEEM system with a surprisingly small investment. You can utilize existing plant steam or install an inexpensive steam generator.

DOWN-THE-LINE ECONOMY—
PHOSTEEM requires a minimum of floor space. Costly controls are completely eliminated. Yet you can use PHOSTEEM anywhere, anytime, for any kind of metal surface preparation!

If your production cycle is low or sporadic PHOSTEEM can be a wise investment to insure superior metal treating quality at a cost consistent with your production schedules. Call in your local Amchem Representative for the facts and figures, or write us direct for complete systems data.

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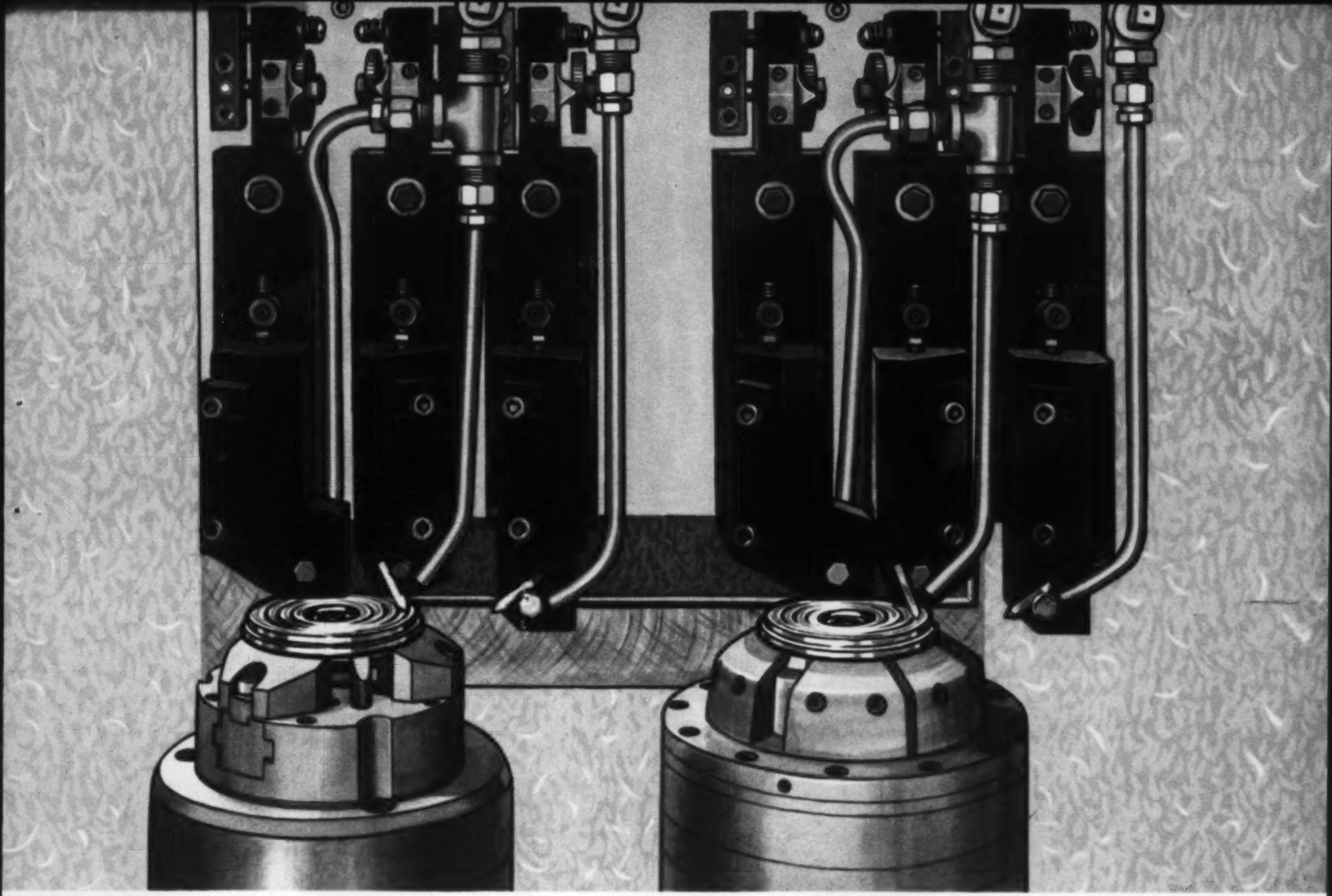


New Britain's new concept for contour turning and boring

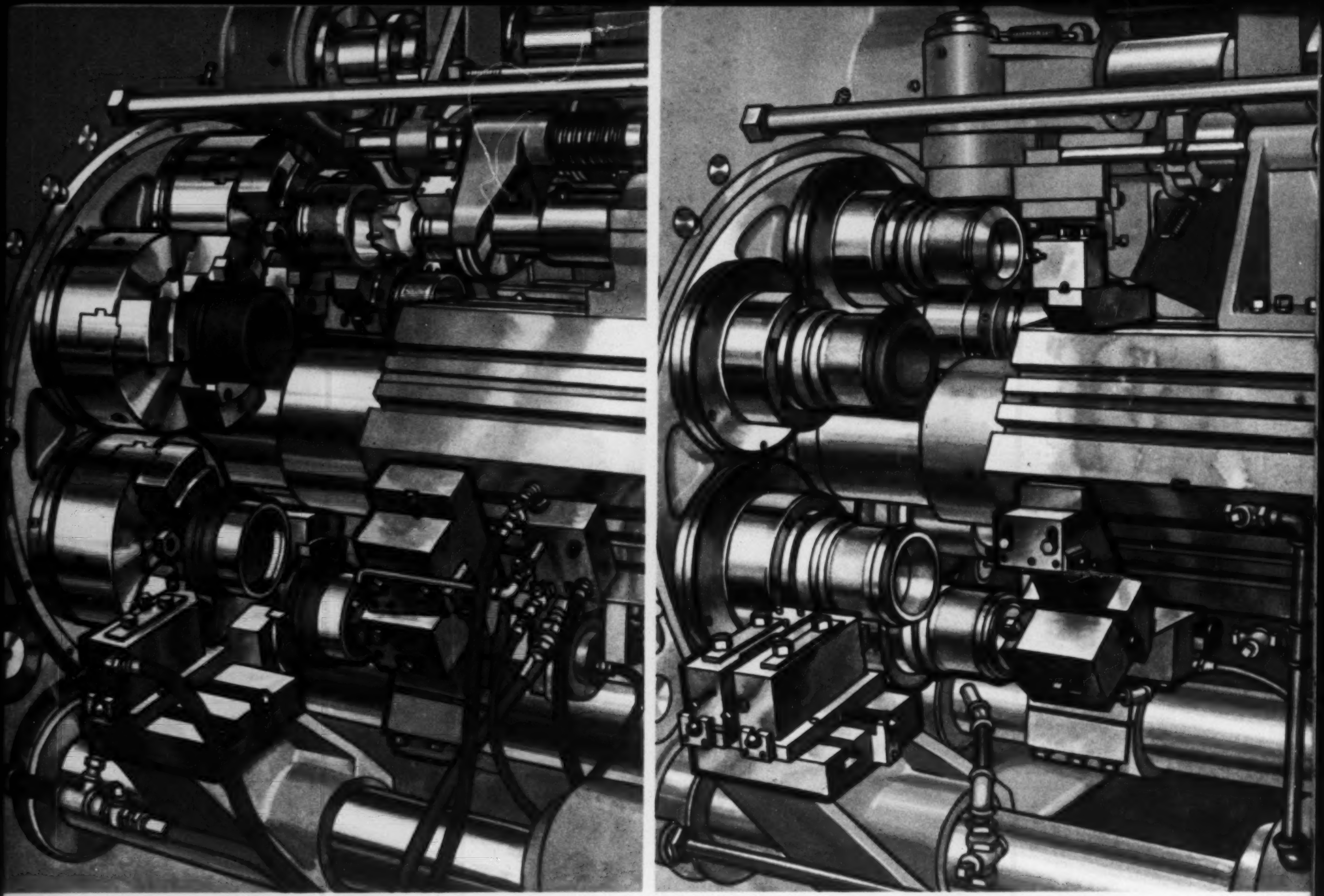
Beyond a certain point, continued refinement of existing designs in machine tools ceases to make an appreciable contribution to performance. Thus in designing our New Series of Vertical Precision Boring Machines, we have incorporated several completely new design concepts to provide improved performance and greatly increase over-all usefulness.

For the first time machines of this type can be used as building block units. Their clean-sided design permits any number of self-contained machines, each with one or more spindles, to be arranged side by side and operated as a single unit. They also may be operated with equal efficiency as individual machines. Parts can be inverted on adjacent machines or on adjacent spindles of the same machine.

In order to take the fullest advantage of the precision inherent in cam control, long linkages between cams and slides have been eliminated. A pair of cams is mounted on a common shaft which is carried *within the vertical slide.* Since all slide actuating forces are contained in the vertical slide, both cams are directly adjacent to the slides they control and no outside forces are imposed on the slide ways. The result is maximum rigidity for heavy cuts coupled with extreme accuracy for close tolerance work.

This unique and eminently workable approach to contour turning and boring results in the highest order of accuracy on even the most complex pieces. Your New Britain Representative can give you details on the nine different models available in this series. For catalog material, write The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Conn.

THE NEW BRITAIN MACHINE COMPANY
New Britain-Gridley Machine Division - New Britain, Connecticut



New Britain . . .
still the best Chucker you can buy

We're not unhappy about the fact that for years, in many plants, the name New Britain has been synonymous with chuckers. New Britain Chuckers have turned out literally millions of pieces of work for practically every major industry in the world. This is less important to the prospective buyer of one of these machines, however, than the capabilities of these machines today. How do they stack up against other chuckers or even other types of machines capable of doing similar work? Pretty well, we think.

New Britain's open-end design still can't be beat for unlimited accessibility to the tooling area. This same wide-open feature makes it doubly more practical to adapt these machines to automatic loading and unloading.

The unusual combination of longitudinal and transverse forming motions is another unbeatable New Britain feature. The massive forming arms on New Britain Chuckers allow heavier cuts and cuts of much greater complexity. This ability to do more work can eliminate the need for second operation machines in many instances. For really complex work, two chuckers set up side by side, as shown here, each doing one side of the piece, can smooth the way for high production. Less complicated work can be set up to perform both sides of the same piece on a single machine.

These massive machines provide the tooling combinations, spindle speeds and power to perform the widest possible variety of work. Their basic design will stay new for years to come, continuing to provide profitable operation. You may know New Britain Chuckers, but you may not be fully aware of the improved series presently being offered. Why not call your New Britain Representative or contact us at The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.

THE NEW BRITAIN MACHINE COMPANY
New Britain-Gridley Machine Division - New Britain, Connecticut

SEE HOW MANY MODERN THINGS THESE STEELS CAN DO FOR YOUR APPLIANCES

When you choose steel for your kitchen appliance line, yours is a product that's all things to all customers—whether they're quality-minded, budget-minded or beauty-minded. In fact, about the only thing that can equal steel's sales appeal is its advantage, economically, to you. Case in point: the modern steels of Weirton Steel Company.

TAKE WEIRKOTE®, FOR INSTANCE—and dispense with the extra costs of anti-corrosion coating operations. Weirkote galvanized steel offers you heavy-duty corrosion resistance, economical flake-free, peel-free fabrication and an advantageously low expansion-contraction rate. The latter gives Weirkote a vital edge over lighter metals—namely, an edge that stays put at the seams, despite the temperature changes that occur in stoves, freezers, refrigerators, washers and dryers. (Weirkote is also available from National Steel's Midwest Steel division.)

OR TAKE WEIRZIN®—an electrolytically zinc-coated steel with excellent corrosion resistance and, when chemically treated, superb paintability. These advantages, plus Weirzin's economical, flawless fabrication, make it an ideal choice for strong, durable, good looking kitchen cabinets.

OR WEIRTON COLD-ROLLED STEEL—to give you a fine, smooth finish and unexcelled ability to withstand the severe forming operations necessary for intricate designs.

OR PRE-PAINTED OR VINYL-COATED WEIRTON STEELS—Factory pre-painting of Weirkote and Weirzin or cold-rolled steel offers you built-in economy, controlled quality and any shade you might want. Vinyl coating, done by National Steel's Enamelstrip Division of Allentown, Pennsylvania, can be ordered in almost any texture and color. Any Weirton Steel goes through all production steps flawlessly and economically.

TAKE MODERN STEEL—particularly in any of the forms mentioned above. For full details, write Weirton Steel Company, Weirton, West Virginia.

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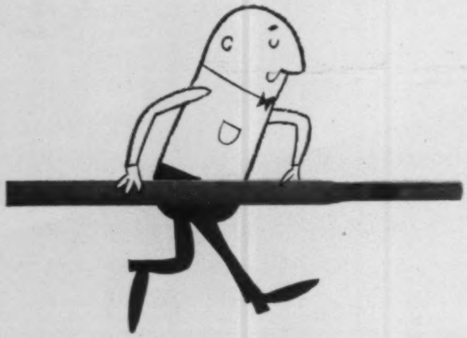
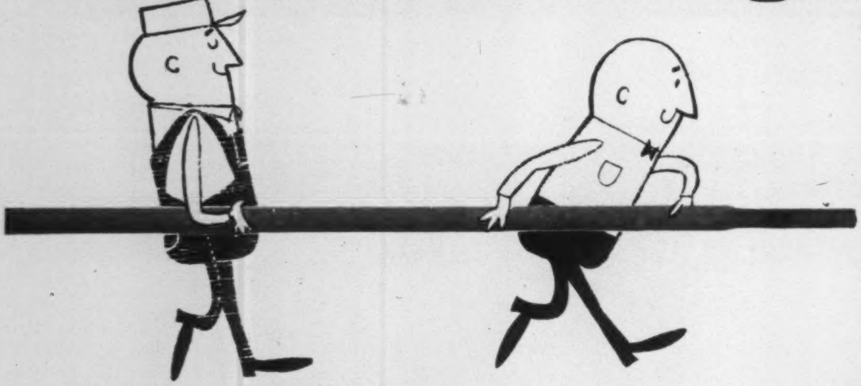
Weirton, West Virginia

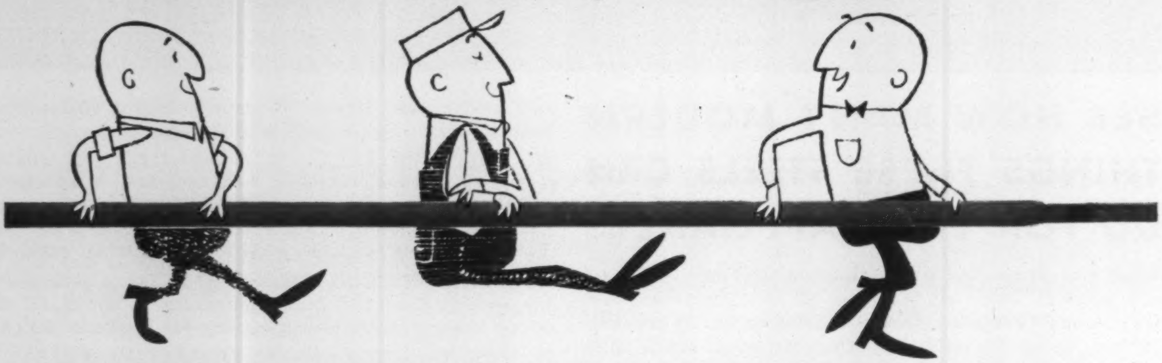
A division of **NATIONAL STEEL CORPORATION**



A. O. Smith will go



to almost any length



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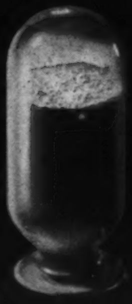

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Pick your toughest tool steel job and try the new Ruby Wheel. You'll find it a veritable "workhorse" for surface grinding, internal, tool and cutter and similar precision work. Ask your Simonds Distributor for details.

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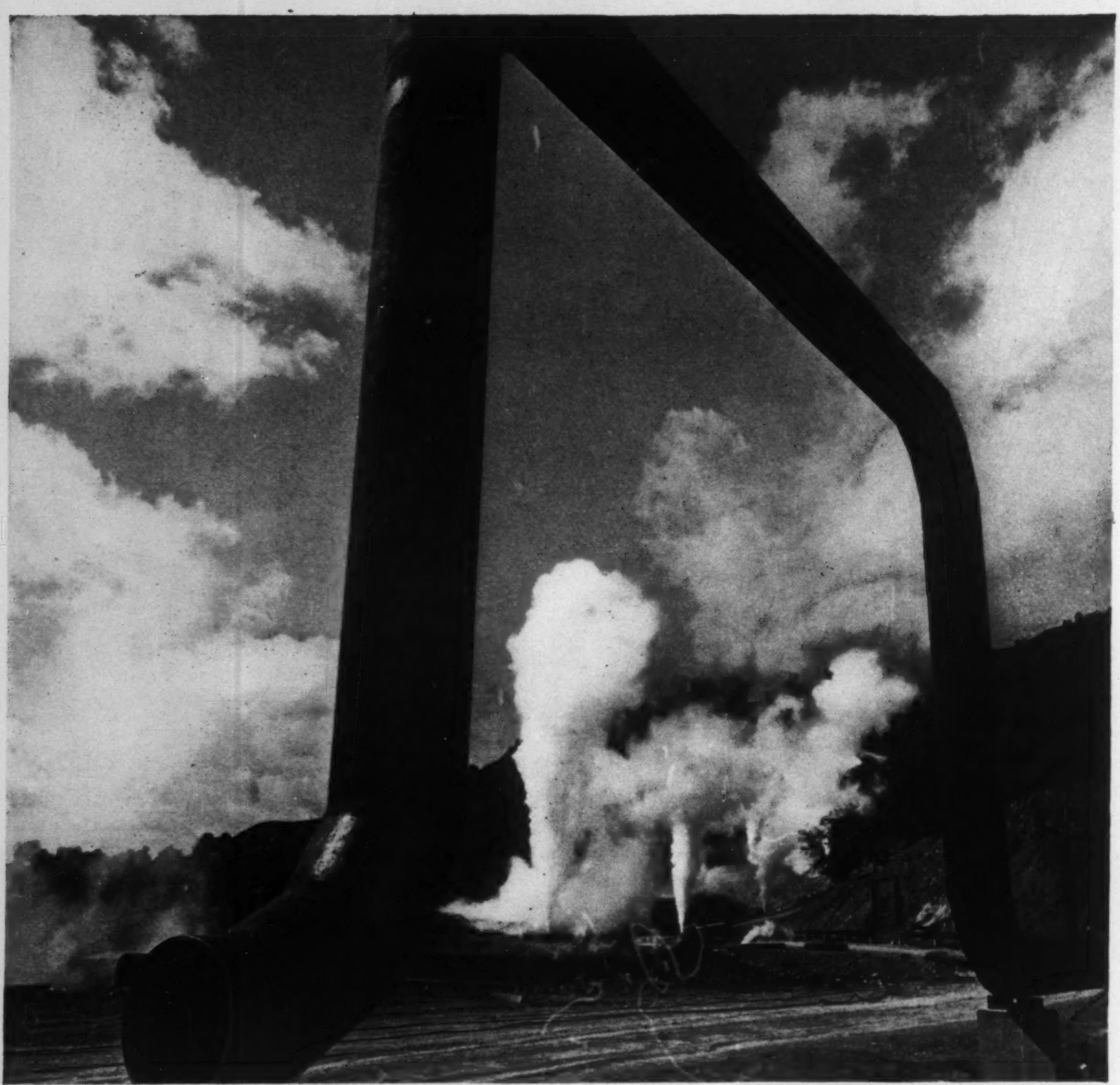

These "geysers" actually consist of steam rocketing up from deep in the ground. From this well area, operated by Magma and Thermal Power Companies, steam is conducted by pipeline to The Geysers Power Plant a quarter-mile away.

Now...electric power from geysers!

Nickel in stainless steel helps make possible America's first geothermal power plant.

Here's a power plant under construction in California that will produce enough electricity for a town of 50,000 people—all from the steam of geysers.

To withstand the continuous attack of this highly corrosive steam at The Geysers Power Plant, Pacific Gas and Electric Company selected stainless steel with nickel for all points where condensed steam contacts metal.

With nickel in it, stainless steel is more than a match for this corrosive steam. This ability plays a key role in turning out power every day of the year, with virtually no maintenance in a plant designed for unattended operation.

Nickel helps metals and alloys withstand the severest conditions. Nickel-containing metals safely hold liquid oxygen at a sub-zero cold that shatters many materials. America's first nuclear-powered merchant ship uses alloys with nickel in them to contain the tremendous pressures and corrosive conditions in its power plant. And an alloy with nickel in it will enable the famous X-15 rocket ship to make the hot ride home from space without burning up.

Does your company have problems of these kinds in a product or a process? Why not write to us about them. Perhaps nickel or one of its alloys can help you.

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THE EDITOR'S VIEWS **STEEL**

September 4, 1961

Automation: Creator of Jobs

Two hundred years ago, Richard Arkwright invented a cotton spinning machine. Force was needed to prevent the 7900 hand spinners and hand weavers in England from smashing his machines. They feared the mechanized equipment would take away their jobs.

Twenty-seven years later, a Parliamentary study showed textile employment in England had multiplied fortyfold—from 7900 to 320,000. Arkwright's machine had given England one of its greatest industries.

We have learned little in the two ensuing centuries. Today, many of our unionists and politicians still blame mechanization (now more often called automation) for destroying jobs. Automation is cursed for contributing to unemployment.

It is one of our most persistent fallacies.

Actually, we need more mechanization to create more jobs. Automation can help absorb the employables among our currently unemployed and provide new jobs for the 13 million who will be added to our labor force in this decade.

Automation reduces the manhour content in a product or service. That lowers the relative cost and permits more buyers to afford the product or service. Volume increases, and total employment in the company or industry may well expand.

Because the cost of goods and services produced with the aid of automation is reduced, the consumer has dollars to spend for other goods and services. More employment is created in other fields. In fact, automation often leads to the birth of new industries.

In the following pages, you will find many examples of how mechanization increases employment and creates new jobs.

Of course, some job displacements result. They must be dealt with in a realistic and aggressively intelligent way. But we shouldn't forget that most of the displacements are in companies and industries which do not automate. As Walter Reuther says: "Automation in Detroit causes unemployment in South Bend, Ind."

That observation has even broader implications: Automation in Japan and Western Europe can cause unemployment in the U. S. unless we install and effectively use the most modern equipment available.

Walter J Campbell

EDITOR

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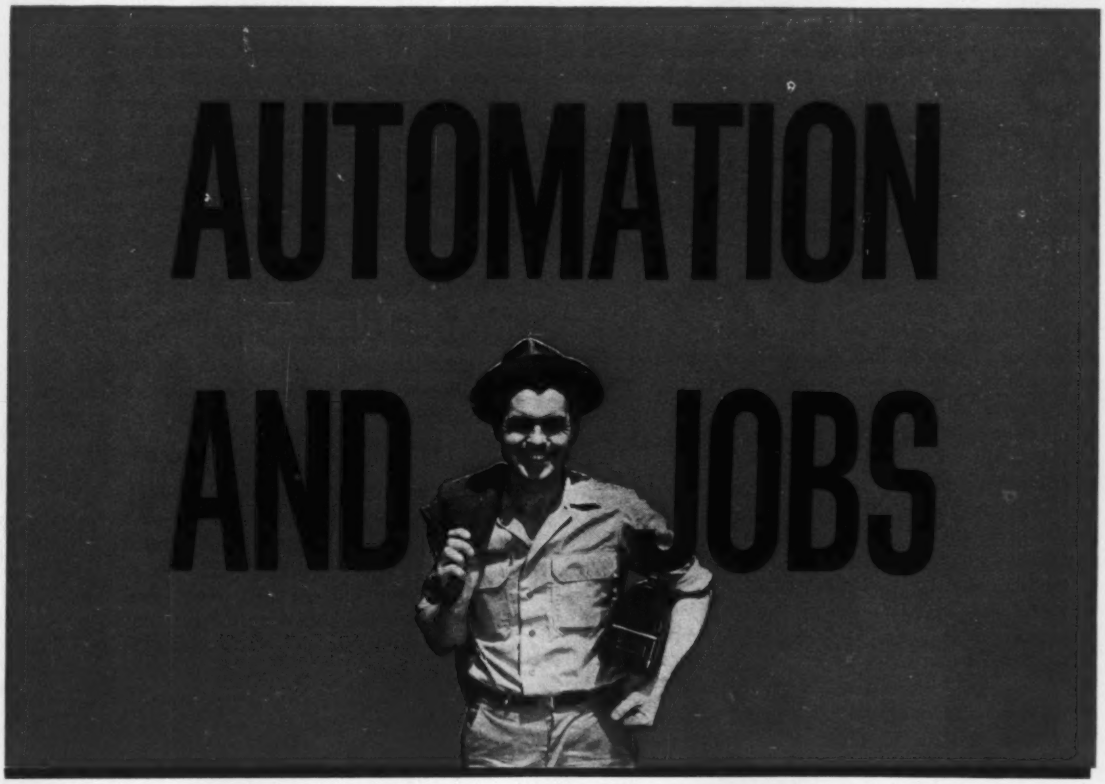
AUTOMATION AND JOBS



AUTOMATION can help create 3.6 million new jobs every year and reduce our full-time unemployment to 3 per cent of the labor force by 1965. Unemployment has averaged 6 per cent for the last three years—8 per cent if you consider underemployment.

How can this be? Here are two examples of how mechanization makes jobs:

1. If a 1962 auto could be built using 1912's methods of manufacture (and it probably couldn't be done), it would cost many, many times what it actually does now. How many could be made and sold next year if the cheapest available carried a price of five figures or higher? The forecasters think we can sell 6.5 million with the actual price level beginning at around $2000 and provide employment for some 600,000. At the much higher price we couldn't even match 1912's output of 356,000 and employment of 125,000. Thus, mechanization does more than create jobs; it saves those we now have.

2. Automation also creates more leisure which leads to more leisure-time industry jobs, as in bowling, which had an employment of 67,000 ten years ago, gives jobs to 135,000 now, and will provide work for 154,000 by 1971.

The rationale is this: By reducing the manhour content in a product, mechanization lowers costs, permitting lower or stable prices. Lower prices increase demand, necessitating more production and employment. More employment and the higher wages that usually accompany it mean more income, creating demand for goods and services that never before existed or that never before were within the reach of many people.

Yet a modern version of what was known as Luddism in the 18th century has curtailed and may negate still more benefits from mechanization, or automation as it is loosely called now. In 1779, an English workman named Ned Ludd roamed around smashing machinery because, as he saw it, machines threatened jobs. Today, we have our own Luddites. They don't smash equipment, but they demand public policies and labor agreements which have much the same effect.

The Luddite view is summarized by James B. Carey, president of the International Union of Electrical Workers: "Automation has resulted in the loss of more and more jobs."

Automation has been unjustly blamed for unemployment in many cases (Page 61). Analysis shows that joblessness is more frequently caused by bad times, low productivity (or the absence of automation), poor management, and other maladies unrelated to mechanization. Only occasionally can the problem be traced to displacement by automation.

Although Luddites deny or minimize automation's long term jobmaking potential, their fears are understandable. Automation is the most rapid form of technological progress we've ever had. But we shouldn't forget that laboring men have been concerned about such advances since the wheel was first fashioned. They are especially alarmed now because:

1. Potential uses cover a broad spectrum—from medical diagnoses to book translations, from payrolls to long range business forecasts, from production "simulation" to plant control. That means a broad range of people is being or will be affected.
2. Automation is occurring in an advanced, high consumption economy. As labor is released, it can find other employment only if over-all demand for goods and services expands. Such expansion has not been fast enough of late, and the problem is compounded by the need to absorb the young men and women now entering the work force—they were born during the high birth rate days of the 1940s.
3. The relative speed with which automation is advancing requires more rapid absorption of workers displaced than in other great periods of technological change.

Although automation is going on more rapidly than former types of mechanization, it's not occurring overnight, and we have time to adjust to its impact if we plan wisely. By 1960, annual installations of automation equipment were valued at $6.5 billion, up 75 per cent in six years. Three factors kept it from spreading faster:

1. It's expensive. A large computer may cost more than $1 million.
2. It takes time. It requires three years to plan, install, and adjust a computer.
3. It's a big, complex job. At recent levels of capital replacement, it's estimated that it would take 55 years and $500 billion to fully automate manufacturing at today's level of technology.

The Luddites imply that all employment declines can be laid to automation. Although mechanization's impact is difficult to measure, you can say this:

Automation, strictly defined, has played only a minor role in employment shifts. An investment of roughly $35,000 is made for each worker displaced by automation. If all replacement spending on equipment in 1960 were for automated facilities, about 500,000 workers could have been displaced. Actual displacements came to about 200,000, and by no means were all those people left jobless.

How Automation Makes Jobs

History shows that productivity is the key to rising living standards and that technological change is a primary factor in increasing productivity. Output per manhour in the private economy rose 46 per cent from 1947 to 1960. It means that 1947's output could be produced by 17.5 million fewer workers in 1960. Further, the gain in productivity paralleled a 10 per cent increase in employment, a 5 per cent drop in working hours, and a 53 per cent increase in private output.

The challenge is to increase physical output still more with additional automation. The object is to create more jobs for our rapidly growing work force.

How can automation do the job? It works its magic in five principal ways (Page 65): 1. By revitalizing the economy or large portions of it. 2. By revitalizing an industry. 3. By revitalizing a company. 4. By creating new industries based on automation. 5. By creating leisure and income to support new industries.

- **Revitalized Economy**—The exhibit on the opposite page shows what has happened in farming—its technology has changed more dramatically than that of any other segment of our economy. We could feed the nation with about the same number of farmers we had in 1860 although our population has increased 460 per cent.

Technological advances displaced many farm hands. But the displacees have been absorbed, and the nation can reap the benefits of lower prices and definitely better quantity and quality in the food we eat and the fibers we wear. Lower prices have enabled us to spend money on other goods or services, which in turn create jobs. The average worker today need labor only 52 minutes to buy a bushel of wheat vs. 16 hours and 36 minutes in 1860.

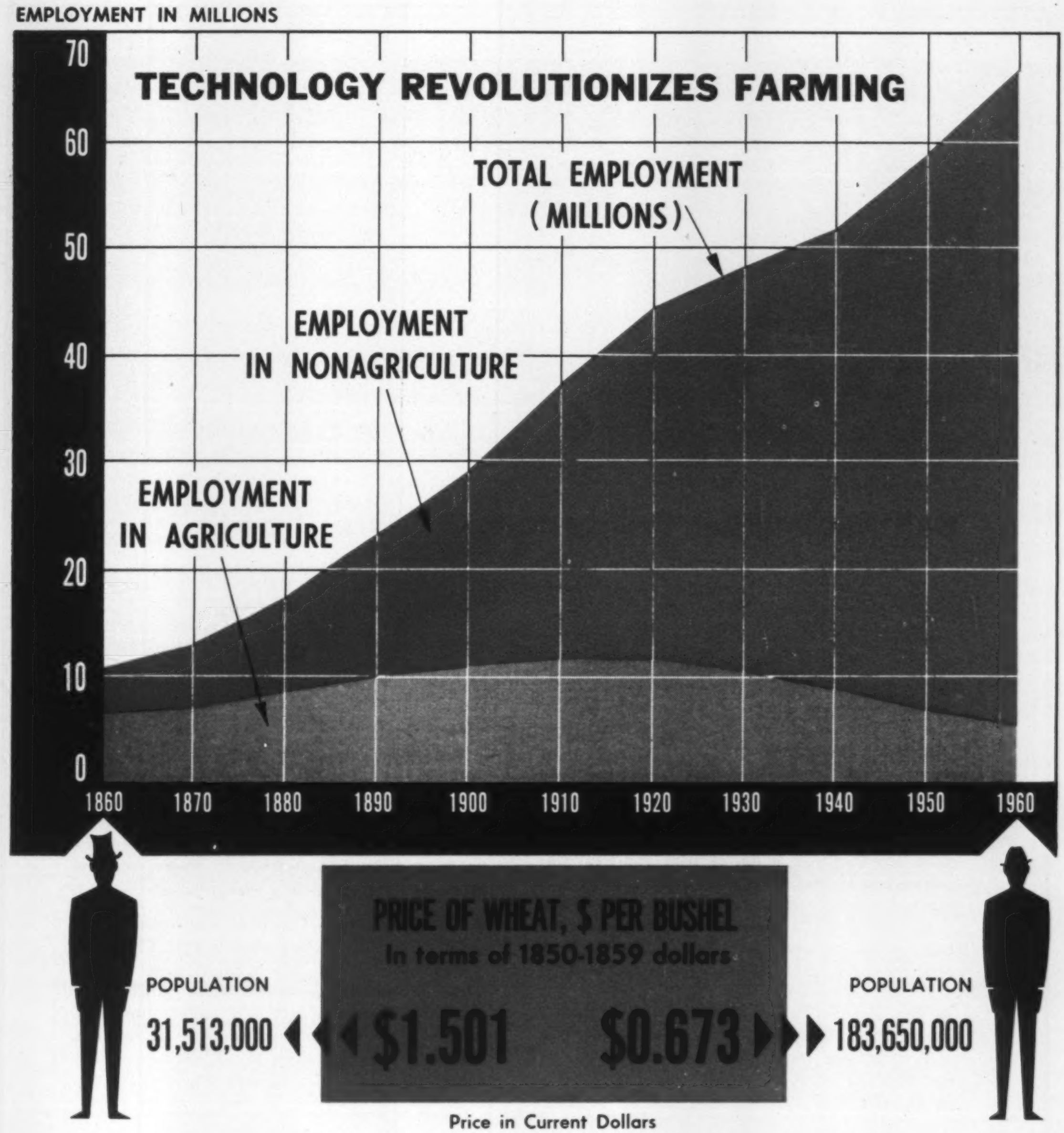
- **Revitalized Industry**—The accompanying exhibit (Page 56) also shows what technological change does to communications. It has created a $4 billion telephone and telegraph industry which promises to be one of the first to make commercial use of space satellites.

Technology has transformed nearly every metalworking industry within the last generation.

- **Revitalized Company**—Technological change has renewed countless metalworking companies. Take General Electric Co. In 1939, the average GE employee earned $2026 a year, including the cost of fringe benefits. The figure rose to $7228 by 1960. Even when you allow for inflation, that represents a 70 per cent increase in real purchasing power. Employment moved from 71,485 in 1939 to 250,621 in 1960.

For the more than 400,000 owners of GE, their equity in the company has more than quadrupled since 1939.

Since 1939, prices of materials purchased by GE have climbed 153 per cent and employee earnings and benefits jumped 257 per cent. But in the same period, GE's prices (on the average) went up only 79 per cent. Some have dropped.



Price in Current Dollars

1860- $1.495 1960- $1.993

- **New Industries**—All kinds of new industries have been made possible by automation, including an industry to make automation equipment. It could eventually be the nation's largest employer.

Here's another example: The manufacture of semiconductor products, an industry created as a result of research on the telephone. In only two years, from 1958 to 1960, the number of firms making transistors and other semiconductors jumped from 45 to 80. And prices plummeted. Quotations on low speed, commercial computer switches dropped 65 per cent; they fell 45 per cent on audio amplifier transistors and 40 per cent on general purpose silicon switching diodes.

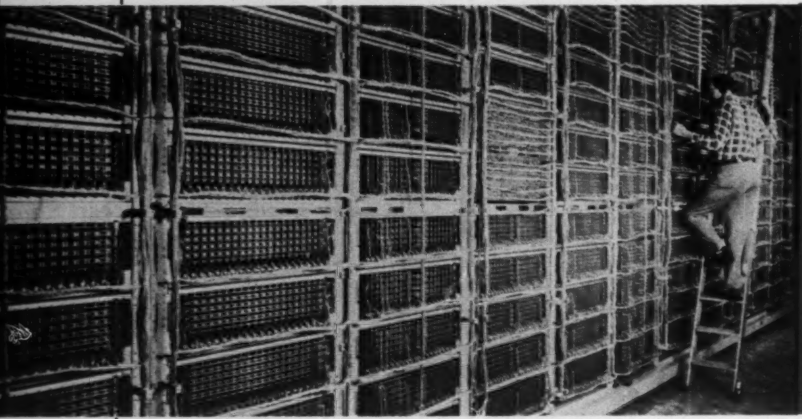
- **New Leisure, Income**—Americans spend $20 billion a year for recreation, double the '50 amount.

Half the $20 billion goes for participation sports—golfing, bowling, fishing, hunting, boating, and others. That's a larger proportion than we had a decade ago and significant to metalworking because those activities require more equipment than the spectator sports.

The Solution

So the major answer to unemployment is growth. One of the best ways to grow is through mechanization, especially the automation type.

The National Planning Association points out: To reduce unemployment to 4 per cent or less by



1960

Operator force	180,000
Total employment	736,000
Bell phones in use . .	62,989,000
Calls per day	219,093,000

Bell Automation Creates Jobs, Spurs Growth

The date was November, 1919. The scene: The telephone office in Norfolk, Va., as the world's first, large volume dial system went into operation.

At that moment, the Bell System embarked on a multibillion dollar automation program that revolutionized communications, started up whole new industries, and brought the magic of the telephone within reach of every American.

Although 97 per cent of the 61 million Bell phones in service now are dial, the system employs more operators than it did in 1920, and total employment of the Bell System has gone up more than two and one-half times, to 736,000 men and women.

The Bell System's automation has had more impact on the company and the country than the planners could have foreseen. Everyone benefited:

● **The Public**—Service is better, less expensive, more reliable. Today, it takes a man only half as long to earn enough to have a phone put in his home as it did 20 years ago. Since 1939, phone rates have risen less than one-half as much as the consumer price index. You can talk cross-country for 3 minutes for $2.25 vs. $16.50 in 1920. And the call can be completed in an average of less than 1 minute vs. 10 minutes then. Transmission is also better.

● **Stockholders**—By 1920, 140,000 shareowners had invested $1.4 billion in the Bell System. Today, some 2 million stockholders have invested $24 billion. Dividend payments have been so regular and stable that the stock has been called the "widows' and orphans' friend." Today, it's also touted on Wall Street as a growth issue.

● **Other Industries**—This year, the company will spend $2.5 billion on new construction. The Western Electric Co. Inc. will purchase more than $1 billion in goods and services from 35,000 firms. (In 1920, Western bought $152 million from 3200 suppliers). Even more dramatic is the creation of entirely new industries as a byproduct of telephone automation. Outstanding example: The discovery of the transistor by Bell scientists seeking

1965 would require a rate of growth at 7.5 per cent per year from 1961 to 1963 and a 4.1 per cent pace from 1963 to 1965. If you remember that other recent recoveries brought 7 and 8 per cent rates of growth, that does not appear to be an over-ambitious goal.

But if we continue to expand at our present 2.5 per cent pace, unemployment would reach more than 13 per cent of the labor force by 1965, unless the average workweek would be sharply reduced. NPA has this to say about the short workweek: "A substantial reduction within such a short time would run into serious difficulties because it would either require a reduction in weekly earnings or force prices up and further endanger the international competitiveness of American industry."

If you assume the 7.5 and 4.1 per cent rates, NPA calculates that by 1965 GNP would reach $640 billion (in 1960 prices), or a gain of almost $140 billion above the 1960 level. In case we drift along, GNP would reach $563 billion by 1965, a per capita increase of only 3.6 per cent over five years or 0.7 per cent per year.

Can we achieve such expansion?

We must. The real question is: How are we going to get more automation? We face obstacles put up by labor, government, and even management. The answers lie in a do-it-yourself program

1920

Operator force	114,600
Total employment	269,000
Bell phones in use . . .	8,736,000
Calls per day	33,125,000

better telephone transmission led to creation of the semiconductor industry.

● **Governments**—Last year, the Bell System paid more than $1.8 billion in federal, state, and local taxes vs. $27.5 million in 1920. Research on telephones established much of the groundwork for the Sage air defense system, the Dew line, and the BMEWS (ballistic missile early warning system), which is under development.

● **Employees**—In 1920, Bell employed 114,600 operators. Today, it has 180,000. The mountainous volume of calls made possible through automation dictated an increase in the operator force to handle long distance and assist with calls. Employment has spiraled in areas like maintenance. Automation has also created better paying jobs. A five year period (1955-1959), illustrates the changes in the work force brought about by automation: Plant craftsmen, up 18 per cent; supervisors, up 17 per cent; business office and sales employees, up 15 per cent.

The Bell System's secret to automating without displacement is careful planning. People who will be affected by technological shifts are notified at least two years in advance of the target date. All employees who wish to remain with the company are absorbed through transfers or retraining. The plant department alone runs training schools with an enrollment equivalent to 5000 full-time students.

Automation will continue to be a prime corporate goal. Within the next few years, all telephones will be on the dial system. Direct dialing of long distance calls will be speeded up. Coming are direct long distance dialing from pay phones and direct dialing on person-to-person calls. An electronic system (replacing electromechanical devices) will handle switching operations in a few millionths of a second. Around the corner is a pushbutton phone that will cut dialing time in half.

Those developments will mean better jobs for present employees and more jobs for more people. Even the number of operators will probably be increased.

If the Bell System had not automated, the story would have a different plot. Says the company: "The Bell System gives employment to such a large number of people because automation has made it possible to hold the line on costs and to furnish telephone service at a price which virtually every American household can afford. Without automation, telephone service long ago would have been priced out of the reach of a large portion of present subscribers."

for management, more enlightened policies from government, more liberal attitudes on work rules and other restrictions by labor, and more co-operation among all three groups.

Do It Yourself

Management needs to plan its spending better, boost outlays in coming years, and get more benefits from the expenditures. In a check by STEEL, machine tool builders could cite only 90 companies in the U. S. that have outstanding re-equipment programs. A survey of 48 Cleveland firms turned up only 1 in 4 that organized its approach to equipment buying.

When your capital spending program is well organized, half the battle is won for a continuing and perhaps increasing re-equipment plan for the years ahead. But the other half of the fight must still be waged. The tactics are to sell your boss on the program.

Any top official in a good company is eager for equipment proposals that will boost productivity. That's part of his job. Any good president is also skeptical—on guard against unnecessary outlays. That's part of his job too.

H. Thomas Hallowell Jr., president of Standard Pressed Steel Co., says: "Middle management must

Four Panels of Managers Probe Problems of Automation And Jobs

STEEL editors invited businessmen in four cities to discuss automation and its effects on employment. The results of their thinking are the basis for much of the material in this special issue. Panel members are listed at the right:

BOSTON

BOSTON

Elden L. Auker
Vice President
Bay State Abrasive Products Co.

Paul C. Eberhardt
Vice President, Engineering
Van Norman Industries Inc.

W. W. Frymoyer
Vice President, Production
Foxboro Co.

James H. Gardner
Vice President
National Research Corp.

E. J. Kneeland
Consultant, Relations Services
General Electric Co.

Henry Little
Arthur D. Little Inc.

E. Robert Livernash
Professor, Industrial Relations
Harvard School of Business

J. Francis Reintjes
Professor
Massachusetts Institute
of Technology

Paul N. Stanton
Vice President & Director
of Marketing
Pratt & Whitney Co. Inc.

H. H. Whitmore
President
Jones & Lamson Machine Co.

CLEVELAND

John J. Adams
Partner
Squire, Sanders & Dempsey

Francis A. Henson
Educational Director, Great
Lakes Territory
International Association
of Machinists

Raymond S. Livingstone
Vice President, Human Relations
Thompson Ramo Wooldridge Inc.

Quigg Lohr
Vice President
American Monorail Co.

H. C. Lumb
Vice President
Republic Steel Corp.

Loren Miller
Assistant to the President
Harris-Intertype Corp.

D. L. Pellett
Director of Engineering Services
B. F. Goodrich Co.

Morris Riger
Director of Political Education,
Ohio
AFL-CIO

Henry W. Spitzhoff
Vice President
Robert Heller & Associates Inc.

Raymond F. Vacha
Director of Industrial Relations
Associated Industries of Cleveland

make top management aware that profits wisely spent within the plant will be the key to greater output, lower costs."

You still haven't fully solved the problem of production efficiency if you don't get maximum benefits from expenditures.

Good organization is a partial step toward maximum benefits. Another is good engineering. You can engineer for higher productivity by minimizing engineering costs (know your vender; play fair with him; give him time to do his job) and by maximizing engineering quality. The key to quality is more manufacturing research, as suggested by *Automation's* publisher and editorial director, Roger Bolz (see Page 60).

Enlightened Government

More enlightened government policies can spur the spread of automation. Such policies run the gamut from labor laws to interest rates, but tax depreciation is perhaps one of the most important areas.

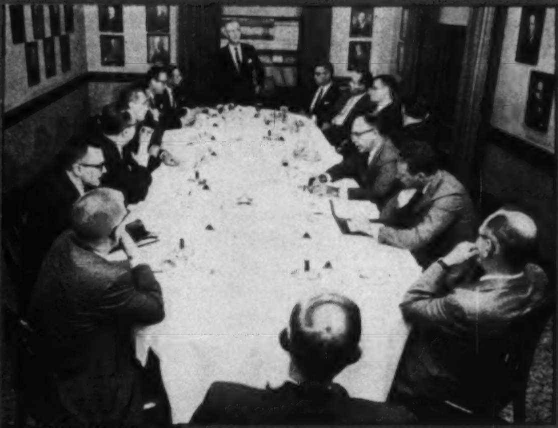
America's archaic depreciation laws are forcing U. S. industry to underdepreciate at the rate of about $6.5 billion a year. Ours is the worst system of any major industrial country in the world.

In the first three service years, businessmen in the United Kingdom can write off 75 per cent of the original cost of equipment; in Sweden, they can recover 72 per cent; in Japan 65 per cent; in Italy 62 per cent; in France 53 per cent; in West Germany 38 per cent; in the U. S. 38 per cent.

Only one major industrial country, West Germany, allows as slow a writeoff as we do over the first three years. Yet that is a recent development. It put on the brakes last year, after a period of liberality, to slow down what was deemed excessive investment activity.

It's no accident that the countries with faster depreciation rates than ours also have faster growth rates.

Rev. William T. Hogan, S.J., director of Fordham University's industrial economics program, tells STEEL that sound changes in our depreciation laws can reasonably lead to our investing 6 per cent or more of GNP in new equipment. We're currently investing about 4 per cent, in contrast with the 8



CLEVELAND

DETROIT

WASHINGTON

DETROIT

Robert H. Erwood
Manager, Labor Relations
Automotive Div., Budd Co.

Malcolm P. Ferguson
President
Bendix Corp.

William Hotchkiss
Manager, Economic Analysis
American Motors Corp.

Robert C. McCoy
Manager, Industrial Relations
Wolverine Tube Div.,
Calumet & Hecla Inc.

Kenneth Porter
Research Director
Employers' Association of Detroit

Clyde H. Reeme
President
Udylite Corp.

M. S. Ryder
Professor, Industrial Relations
University of Michigan

George Tann
Executive Vice President
Tann Corp.

WASHINGTON

Don Ackerman
Staff Director
House Republican Policy Committee

Walter Buckingham
Director, School of
Industrial Management
Georgia Institute of Technology

Ewan Clague
Commissioner
Bureau of Labor Statistics

Albert S. Epstein
Economist
International Association
of Machinists

Eugene P. Foley
Deputy Assistant Secretary
Department of Commerce

Raymond D. Larson
Assistant to the
Assistant Secretary
Department of Labor

William H. Moore
Economist
Joint Economic Committee,
U. S. Congress

Stanley H. Ruttenberg
Research Director
AFL-CIO

Emerson Schmidt
Manager, Economic Research
Department
Chamber of Commerce of the U. S.

Ralph Young
Adviser to the Board of Governors
Federal Reserve System

to 10 per cent in West Germany, Japan, and Belgium.

A new tax credit plan was before the House Ways & Means Committee, but it has been shelved because of the Berlin crisis. Reform will have to wait at least another year.

Maurice E. Peloubet, New York tax expert, says: "The question is not whether we can afford liberalized depreciation. It is, rather, whether we can afford our present outmoded system which is stifling economic growth, reducing income, and reducing employment opportunities."

Labor's Restrictions

Most labor leaders profess to be in favor of automation, yet nearly all have a "yes, but . . ." attitude. John L. Lewis is one of the few to embrace mechanization completely because, as he says: "It's better to have 500,000 prosperous coal miners than 1 million who are half starved."

The 1959 steel strike was, in essence, fought over the issue, with the battle on work rules. The union kept its restrictions in the contract, limitations which reportedly cost the steel industry 7 cents per hourly

ROGER BOLZ
publisher and editorial
director of *Automation,*
says this about . . .

Manufacturing R&D

"As the need for automation grows, long range manufacturing research and development becomes more imperative. The most important fact for management to recognize is that effective manufacturing research does not evolve by itself. Neither can it come completely free through the generosity of equipment venders. It is a planned investment in the future.

"Most managers recognize the value of investment in the future where new or improved products are concerned. There, the question is what path to follow.

"The case is different where research and development in new production methods and machinery are involved. Here, rather than finding decision in terms of future corporate profits, many executives relegate the problem to manufacturing managers as a cut-and-dried procedure from which specific returns must be guaranteed. That often results in manufacturing costs far higher than necessary.

"Most discussion and effort are directed toward study of capital equipment replacement procedures, almost as if the problem is a matter of making a purchase from one of a large variety of suppliers. There's too little study of the real issues: What are the *right* processes and *right* equipment in terms of competitive costs and a good profit? Investigate your manufacturing system step by step for new approaches. Ask: Starting with product design, is it economically feasible to modify or advance any part of the system?

"Are you providing your manufacturing and process engineering teams with the tools for insuring profitable operations? An adequate manufacturing research and development program will create the best bulwark against the competition ahead.

"Tomorrow's most profitable manufacturing innovations will result from today's manufacturing development work. In creating radically new approaches to automation, you will drill a few 'dry wells.' But where little is risked, little will be gained."

employee per hour. Secretary of Labor Arthur Goldberg predicts: "Not wages, but fear of being thrown out of work by machines, will cause future strikes."

Some of the blame for union attitudes can be laid to management's failure to sell labor on production efficiency. (See Page 86.) Here are ten suggestions to help remedy that:

1. Show that jobs depend on high productivity.
2. Demonstrate that higher efficiency means higher pay.
3. Present the facts of life about competition.
4. Let workers affected know of equipment buying plans.
5. Be honest about any necessary layoffs or displacements.
6. Give help in getting other jobs for those you will have to discharge.
7. Don't "make work" for unnecessary employees; discharge is fairer.
8. Report on your plans quickly before the grapevine spreads rumors that will take time and trouble to correct.
9. Show how increasing mechanization has boosted our living standards.
10. Show how continuing mechanization is needed to meet foreign competition.

Co-operation

The Labor Department's new Office of Automation (Page 72) has as one of its goals the achievement of greater co-operation on automation problems among management, labor, and government. It hasn't been functioning long enough to do much yet, but its formation is promising.

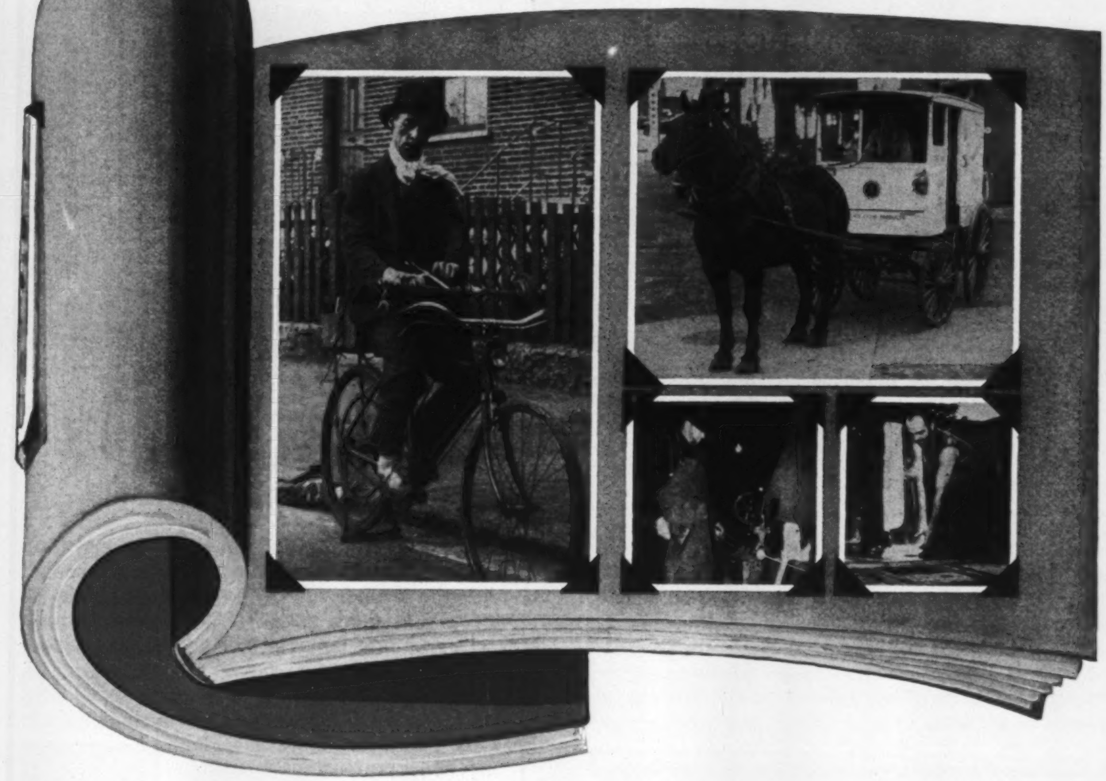
You can find some instances of co-operation now. A few examples:

- Management and labor are co-operating with the Philadelphia Board of Education on a vocational training program.
- The president of a West Virginia coal company had developed a retraining program widely supported by government and labor (Page 75).
- Unions sometimes help to foster automation. Examples: The co-operation of a United Auto Worker local with Parker-Kalon Co. permits management to transfer workers from job to job freely (Page 68). The United Mine Workers has joined with the bituminous coal industry in sponsoring equipment research programs.
- Amalgamated Lithographers of America, Local No. 1, has run ads in national magazines urging more automation, not less.

Can we achieve more automation? We must, or else. Roger M. Blough, chairman of U. S. Steel Corp., says: "Obstructionists may slow the introduction of new methods, but man's search for new and better ways of doing things will sweep by them—if not in this country, then in a competitive one—if not today, then tomorrow."

• Bound reprints of the study on Automation and Jobs are available at $2 a copy; prices for larger quantities on request. Write Reprint Dept., STEEL, *Penton Bldg., Cleveland 13, Ohio*

Obsolete Jobs — and Aren't We Glad!



What Causes Unemployment

> "It has been calculated by the ablest politicians that no state, without being soon exhausted, can maintain above the hundredth part of its members in arms and idleness."
>
> —Edward Gibbon (1737-1794), author of *Decline and Fall of the Roman Empire*

THOSE POLITICIANS apparently weren't far wrong in their calculation. The U. S. has, for several years, been maintaining more than three times that number in "arms and idleness" and, while we're not exhausted, we have found the burden far too heavy for comfort.

Throughout the nation, one of the prime concerns is the reduction of unemployment. Proposals are countless—and they range from reasonable to ridiculous. Lest some of the latter be adopted, we must examine the real reasons for the idleness, place the problem in its true perspective, and be content only with sound, long term solutions.

It is no easy task. The causes of unemployment are highly complex and interrelated. They stem primarily from the delicate balance between the profit motive and the desire for security. They reflect the many facets of freedom—freedom in the choice of what we consume, freedom in the choice of occupation and location, freedom in our political beliefs.

The exercise of those freedoms can temporarily upset the delicate balance wheel that permits our

The Four Faces of an American Century

Farm jobs formed the backbone of the U. S. economy

The factory worker was now the "typical American"

Service workers had become dominant in the U. S.

economic system to function smoothly. When that happens, our growth mechanism falters and displacements occur until the right combination of free choices again sets the economy on balance for a new spurt.

Our task is to eliminate, without diluting our free enterprise system, this "roller coaster" pattern of economic advance.

- **Gaining Perspective**—In tackling the unemployment problem, let's first be sure to view it in the context of high general employment.

Next, let's recognize that our economic system has, over the long pull, proved its basic soundness. In the last 50 years, for example, gross national product per capita has more than doubled. We did it with a large increase in population, with no great change in the proportion of the population that had to go to work, and with an increase in leisure time for the worker.

A large increase in productivity was the key to the impressive advance.

So let's examine the causes and cures of unemployment in the light of three bases—high over-all employment, a sound system, and dedication to productivity improvement.

The Size of the Problem

The unemployment problem cannot be considered small because it has averaged around 6 per cent of the labor force for three years. The problem looms even larger if we look at it in terms of idle hours, not idle men. If you add the full-time equivalent of part-time unemployment to full-time unemployment, the average total unemployment over the last three years approaches 8 per cent.

- **Idleness Prolonged**—The other disturbing facet of the problem is the upward creep in the length of unemployment from one period of prosperity to the next. For example, in 1953 the average duration of unemployment per idle worker was about eight weeks; in 1960, it was almost 13 weeks. In 1953, people out of jobs for more than six months totaled less than 5 per cent of all unemployed; in 1960, the percentage more than doubled.

- **More Job Seekers**—The third aspect of the problem involves the increase in the number of people entering the labor force. We must create more than 25,000 new jobs every week—about 1.3 million each year—during the next ten years, to merely absorb the net increase in the nation's work force. When you add to that the 4.8 million persons now unemployed, plus the additional employment opportunities needed to offset productivity gains (1.8 million persons if productivity increases by a modest 2.5 per cent annually), you discover that we must create 3.6 million new jobs every year if we are to reduce full-time unemployment to 3 per cent of the labor force by 1965.

We'll be able to do that if we increase productivity rapidly—and if we pass a significant portion of the benefits of increased productivity along to the consumer in the form of lower prices, so that money will be unleashed to purchase additional goods and services, creating jobs in new sectors.

Why Unemployment Exists

First, let's recognize that displacement and unemployment are not the same animal. For example, if productivity in the U. S. advances 2.5 per cent this year, 1.8 million people will be displaced—

Man has lots of leisure, thanks to automation

we'll be able to turn out the same quantity of goods and services with 1.8 million fewer people. But the vast majority of those will never become unemployed. Many will be transferred to other jobs in the same companies. Others will immediately find new jobs—created by the benefits of the productivity that displaced them (see Page 65).

And workers are displaced for many other reasons—changes in the location of markets, development of substitute materials, elimination of featherbedding, changes in demand, and foreign competition, to name a few.

Since all of those factors are at work simultaneously, it is impractical to try to identify the specific reason why a worker loses his job.

But we can divide unemployment into four categories:

1. Cyclical—when it's caused by a downward movement in aggregate demand.
2. Seasonal—when it results from predictable fluctuations during the economic year.
3. Transitional—when a person voluntarily leaves a job to find another.
4. Structural—when unemployment is the result of shifts in demand from one product to another, shifts in job opportunities from one location to another, changes in skill requirements, changes in the international economic structure, technological changes that obsolete jobs, and discrimination against job seekers due to age, race, or other such reasons.

Transitional unemployment, while accounting for a sizable portion of the total, is no major problem because it is of such short duration.

Seasonal unemployment is diminishing in importance. In the first place, it is regular, predictable, and self-eliminating. Also, fewer and fewer people are being affected by it because employers are diversifying—for example, developing supplementary, off-peak lines—and carrying finished goods inventories. And alternative employment—for example, jobs in the tourist industry—is absorbing some of the seasonally unemployed.

The two remaining categories—cyclical and structural—are the real problems. Dr. Walter E. Heller, chairman of the President's Council of Economic Advisers, suggested in February that cyclical unemployment accounted for about 40 per cent of total unemployment. The solution to the problem lies in smoothing out, at a high level, the peaks and valleys in the business cycle. The keys to that are better inventory control procedures and less severe fluctuations in the capital investment trend.

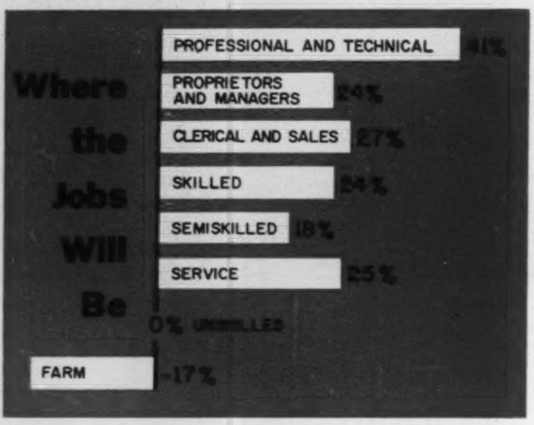
Unemployment and Automation

If we could solve the problem of cyclical unemployment, much of the concern about structural unemployment would vanish because a smoothly growing economy could re-absorb the structurally unemployed.

It is impractical, if not impossible, to eliminate structural unemployment. In a free economy, customers decide, in effect, whose work they will buy and whose work they're willing to do without. The "outs" are displaced. Take the switch from rails to other forms of transportation, or the transition in government spending from aircraft and other defense items to missiles and nuclear weapons. Those changes in customer wants have left pockets of unemployment in their wake.

Another cause of structural unemployment is the geographical transition of industry. As markets move, industry follows. And like the Pied Piper of Hamelin, industry takes the youth of a community

Most unemployment is, and will be, centered among low skilled persons. Job opportunities are continuing to grow—rapidly—in many other categories. Here's how the Bureau of Labor Statistics sees the percentage change in employment by major occupational groups between 1960 and 1970 . . .



with it; there is nothing left to keep them. But often the older folks stay behind—creating "depressed areas" because few local job opportunities are left.

The solution to those problems seems to lie in the encouragement of resources, both labor and capital, to move from declining industries, areas, and occupations into expanding industries, areas, and occupations.

One reason for the present, abnormally large geographical shift of industry: Production demands during World War II forced companies to expand in existing locations far beyond the point of effective, long term, business operation. Now that the wartime plants are becoming obsolete, they're being abandoned for new plants closer to the market.

Other displacements result from changes in consumer tastes. The decline of the medium-priced car and rise of the compact is an example. Compact car buyers ask for fewer accessories, buy fewer automatic transmissions. Jobs are lost in the auto industry. But thanks to the lower price of the compacts, dollars are unleashed to buy hi-fi sets, or dishwashers, or airline tickets to Paris. And jobs are opened in those industries.

A newer cause of displacement is the shift in international markets. U. S. exports aren't keeping pace with the growth in international trade. Some jobs have been lost to aggressive foreign competitors. General Electric Co., for example, has lost 500 jobs to Japanese competition in Christmas tree lamps.

The last, and most often blamed, reason for structural unemployment is automation and other forms of technological change. It does create some displacements: 1. By rendering some jobs obsolete. 2. By downgrading other jobs so that employees don't like them and leave. 3. By causing a backward competitor to lose sales and be forced to release people. As E. J. Kneeland of General Electric Co. puts it: "The unemployed due to automation were in the plants that failed to automate." 4. By increasing optimum plant size to the point where smaller firms are forced out of the market. As Walter Reuther puts it: "Automation in Detroit causes unemployment in South Bend, Ind."

But it's unfair—even if it were possible—to simply tally the workers displaced by automation and come up with an unemployment figure. That approach discounts the job opportunities created by automation (see Page 66).

The Hard-Hit Groups

Seymour L. Wolfbein, deputy assistant secretary of labor and head of the Office of Automation & Manpower, has identified these five groups—distinct, yet overlapping—as having the toughest unemployment problem:

1. Youth—For the last three years, at least 1 out of 8 teen-agers seeking work has been unable to find it.
2. Unskilled—Nearly 1 out of 5 unskilled workers was unemployed during the first half of this year —a jobless rate twice that for skilled craftsmen.
3. Older Workers—These people generally have good job security, but when they lose their jobs, it's mighty tough for them to find new ones.
4. Negroes—Because Negroes tend to have the least education among members of the work force, they are concentrated in unskilled trades and experience job discrimination. Mr. Wolfbein estimates that their jobless rate is roughly double that of their white colleagues.
5. Depressed Areas—During March, the areas of substantial labor surplus accounted for 55 per cent of U. S. unemployment.

Unemployables?

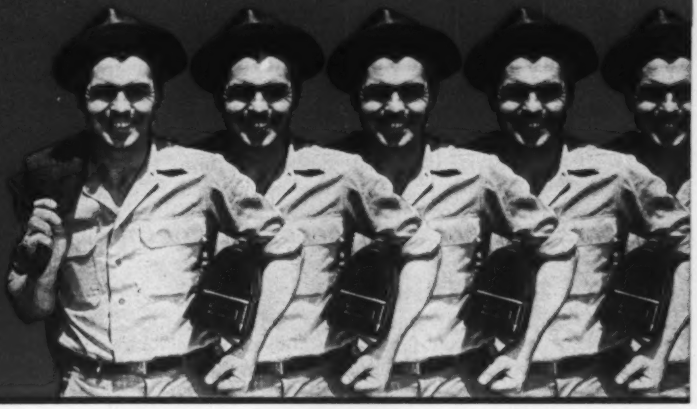
In the play, *Tobacco Road,* Jeeter Lester let a handful of worn-out soil trickle through his fingers. It was worthless land, he said—wouldn't even grow turnips anymore. But it was his land, the land on which his daddy grew up, and Jeeter would be damned if he'd ever leave it.

Many people predict that we're bringing about a whole class of Jeeter Lesters—people who lack the necessary intelligence, training, incentive, or other attributes to become jobholders in an advanced society. This problem tends to be overstated, but it merits further study.

Conclusion

Unemployment is a serious problem, but it can be overcome—through diligent study and the adoption of sound policies. As Wernher von Braun once quipped: "We can lick gravity, but sometimes the paperwork is overwhelming."

HOW AUTOMATION CAN CREATE MORE JOBS



"UNLESS the installation of automation and technological change can be so managed as to minimize their human impact, we may find ourselves faced with a Frankenstein monster which can destroy the human and economic progress so laboriously built in recent decades."

David J. McDonald, president of the United Steelworkers, made that statement, echoing a popular notion that automation (loosely used to mean mechanization generally) is a bogey that devours jobs. He's not the first to have such fears. Hundreds of years ago, the quill penmen of Paris rioted against the introduction of the printing press. A Danzig mob drowned the inventor of a weaving loom in 1661, and bargemen on the Fulda River destroyed Denis Papin's steamboat in 1707, setting back steam propulsion of ships almost a century.

Yet statistical proof is overwhelming that mechanization creates jobs in the long run. In 1760, when Richard Arkwright invented his cotton spinning machinery, 7900 handspinners and handweavers were producing cotton textiles in England. Their opposition to the machinery had to be put down by force. Twenty-seven years later, a Parliamentary inquiry showed textile employment had multiplied more than 40 times, from 7900 to 320,000. So machines helped to give England one of its greatest industries and periods of usefulness.

About 1890, hand typesetting was being rapidly replaced by machine composition in the U. S. printing industry. Alarmists predicted that 36,000 hand compositors would lose their jobs. By 1897, 18,000 had been displaced, but the demand for printing had increased so much by 1903 that machine composition shops were employing far more men than the hand shops ever did.

Here's how the magic of automation works: Mechanization lowers costs, permitting lower or stable prices. Lower prices increase demand, necessitating more production and employment. More employment means more income, creating demand for goods and services that never before existed, or that never before were within the reach of many people. That, in turn, creates new jobs to supply those goods and services.

Let's take a look at five typical ways automation operates:

1. By lowering costs and increasing the market

for the product through lower prices. 2. By doing things never before possible or practical. 3. By creating new industries based on technological advances. 4. By generating a new industry to make automation equipment. 5. By spurring leisure and other activities.

1. Lower Costs, Bigger Markets

Think how the market for light bulbs would be restricted if the common 100 watt lamp were made by methods of the 1900 era. They'd sell for $4.10 instead of 25 cents.

At the turn of the century, the introduction of semiautomatic and automatic glassmaking machinery revolutionized the glass industry in the U. S. Output per manhour with machines vs. hand methods was about 40 times greater for small prescription bottles, about 30 times greater for light bulbs, nearly 15 times greater for milk bottles, and more than 12 times greater for table tumblers.

There's another way of looking at it: If demand for many products and services had somehow reached current proportions without technological improvements, we would not have the human resources to meet it. For instance, the 1920 methods of handling telephone calls would require the employment of every adult female in the U. S. to manage the load.

2. Doing New Things

Technology creates new jobs in another way too. "You use most of this new technology to do things you didn't do before," states John Diebold, consultant on automation. "People say that a specific machine does the work of 15 people. Then they multiply the number of machines installed this year by 15 and take this figure as the resulting unemployment. This isn't what happens because you don't do tomorrow by machine what you did today. You do different things. That explains why the people in companies using the 5000 computers in service outnumber the people who have been displaced."

Another example of this phenomenon is furnished by Ford's experience in the manufacture of transmissions. In 1950, nearly all Ford vehicles were equipped with manual transmissions produced by the company. Some 3100 hourly employees made them.

Improvements in design and manufacturing technology brought automatic transmissions—vastly more complicated mechanisms—within the reach of the mass market. As a result, during 1960 some 9000 Ford employees—three times the number in 1950—made transmissions, although vehicle production had increased by only one-eighth.

3. New Technically Based Industries

Automation creates new jobs in still another way —by creating new industries. The entire atomic energy industry rests on automation because no human could operate valves or hand controls within a reactor and live. Polyethylene, the flexible plastic used for packaging and squeeze bottles, could not be made without automation. Color television

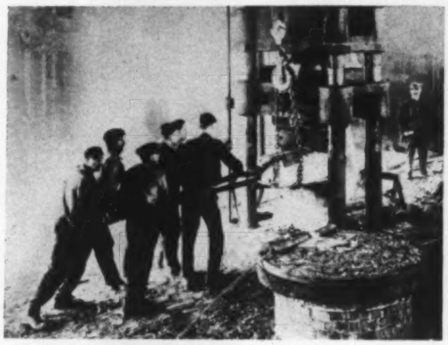
Jobs in the 'Growth Industries'

	1951	1961	1971
Education (Teachers & Supervisors)	995,200	1,526,100	1,900,000*
Automation Equipment	113,000*	600,000*	1,180,000*
Motels	129,000	225,000	326,000
Swimming Pools (Production & Maintenance)	15,000	150,000	250,000*
Airlines	83,000	161,000	225,000*
Bowling (Production & Operation)	67,400	135,000	154,000
Sporting & Athletic Goods	25,700	42,000*	58,000*
Boat Building & Repair	8,850	31,200*	54,000*

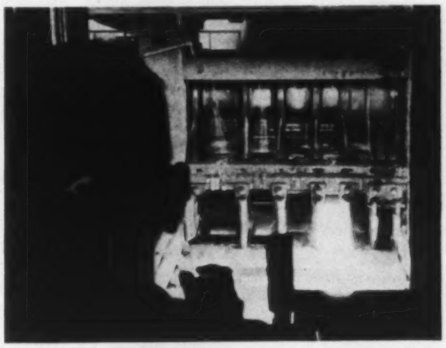
*Estimated by STEEL. Sources for other figures include Census Bureau, industry and company estimates.

Automation Can . . .

Boost Jobs, as at Timken



IN 1919, eight men turned ingots in a press at Timken's steel mill.



TODAY, one man does the same operation on Timken's 35 in. blooming mill.

Although the size of Timken Roller Bearing Co.'s crew has been reduced by seven, total employment has increased. Forty-two years ago, only 24 men worked in the blooming mill department, including the eight-man crew. Today, it takes 89 people to handle all auxiliary operations directly connected with the department. In 1919, Timken employed 754 men in its steel and tube mills. Today, more than 3000 work in its Steel & Tube Div.

But an employment gain is only one benefit of mechanization.

In 1919, the company's crew had to manhandle a 4500 lb ingot, which reached an average working temperature of 2250° F. Today, the one man in an air conditioned cab operates electric controls to handle a 6160 lb ingot.

is at last on the threshold of mass markets because an automatic machine permits lower prices. It accurately spaces hundreds of thousands of colored dots on each picture tube.

From 1945 through 1958, employment increased by 16,400 at E. I. du Pont de Nemours & Co. because of the discovery or commercial development of new products.

4. Self-Generating

Automation creates an industry that makes automatic machinery. STEEL estimates its employment is 600,000 today and will reach 1,180,000 a decade hence (see the exhibit on Page 66). "Automation will become one of the largest—possibly even the largest—national industry," predicts Dean E. Wooldridge, president of Thompson Ramo Wooldridge Inc.

5. Spur to Other Activities

Also credit mechanization with spurring jobs in areas far afield. For example, it creates a greater need for education and, consequently, for teachers and supervisors. It means an increasing need for travel and, as a result, jobs for motels and transportation firms, notably the airlines. By building jobs and raising pay, it helps to generate new leisure time enterprises in such fields as home swimming pools, bowling, other sporting and athletic goods, boat building and repair. The table on Page 66 summarizes the job possibilities.

Automation: Jobmaker

We need more, not less, automation to help solve our unemployment problems. As R. Conrad Cooper, vice president of U. S. Steel Corp., points out: "The really tragic technological unemployment occurs not in the companies making technological improvements, but in those that do not, thereby losing their ability to compete and sustain more and better jobs."

You have seen the truth of Mr. Cooper's statement in the Bell System's experience (Page 56). But it's a giant. What about its much smaller competitor, General Telephone & Electronics Corp.? About 80 per cent of the 3 million telephones in the General System were dial operated in 1955. The network had 32,000 employees. More than 93 per cent of the 4.7 million telephones in the system are dial operated today. Employment is 44,500.

General Motors Corp. is another company that has automated extensively. Between 1948 and 1959,

Automation Can . . .

Increase Pay, as at Parker-Kalon

When Parker-Kalon Co. moved from its New York location six years ago, it left an outmoded plant for one of the most automated in the fastener field, at Clifton, N. J.

In almost every case, the men who followed the division of General American Transportation Corp. to Clifton have higher paying jobs and more responsibility. Not a single worker was displaced because of automation, and none had to take pay cuts.

Automation at Parker-Kalon has meant shifts in jobs. Fewer work in production, but many more are in customer service. Shipping employment has spiraled.

The company plans its upgrading. When the need arises, a good semiskilled man is put through a program that includes classroom sessions, on-the-job instruction, and on-the-job work. After six months, he's increasing productivity for the company and making more money for himself. A UAW contract which permits the company to transfer men freely is one important reason why it has been able to retain and retrain employees whose jobs are eliminated by automation, points out Industrial Relations Manager C. E. Barnes.

Consider Maxie Dueno, 48, a weighmaster on the day shift. He keeps detailed records of each batch of fasteners that moves by on the automated conveyor line. He transfers the information to IBM cards so the company has an up-to-the-minute check on material in process and in inventory. Ten years ago, Maxie earned 98 cents an hour as a hand trucker for the company. Now he makes $2.33 an hour, plus about 7 hours of overtime pay each week.

Without automation, Maxie would still be a hand trucker (if he had a job at all with the company), says President Simon S. Kahn.

its employment rose 29 per cent, while the country's labor force gained only 14 per cent.

The exhibits on Pages 67-69 show how three other companies have offered new employment opportunities because they have automated. The railroad industry example (Page 70) shows what happens to jobs when the benefits from automation are limited by union contracts and federal regulations.

Despite union disclaimers, you can see how the magic of automation works in the steel industry over the long pull. Between 1939 and 1960, the industry mechanized to such an extent that it increased its shipments per manhour by 56 per cent. Production doubled, while employment rose from 482,600 to 586,700.

In the automation-spurred industries growing more dramatically, such as electronics, job gains are equally sensational. Today, the electronics industry employs 1.5 million in its manufacturing, distributing, servicing, and broadcasting branches vs. 70,000 before World War II.

Automation, Jobs, and Future

During the last 40 years, the U. S. experienced the most rapid and highly developed period of mechanization in its history. Jobs and job opportunities increased by 30 million.

Lately, the growth in jobs has declined, but so has our rate of spending for new equipment. STEEL's surveys of metalworking's orders for capital equipment show: Orders came to $4 billion in 1959; climbed to $4.7 billion in 1960, then dropped to $4.3 billion this year.

Heavy capital investment leads to employment increases. See the evidence of that in this ranking of ten major industries, based on comparisons of 1953 vs. 1899 data:

	Rank According to:	
Industry	Capital Investment Increases	Growth in Number Of Jobs
Electrical Machinery	2	1
Telephone	4	2
Electric Light and Power	3	3
Natural Gas	1	4
Transportation Equipment	7	5
Rubber Products	6	6
Oil and Gas	9	7
Chemicals	8	8
Petroleum, Coal Products	5	9
Nonelectrical Machinery	14	10

Automation Can . . .

Upgrade Skills, as at IBM

O. M. SCOTT
President, General Products Div. IBM

Eight years ago, International Business Machines Corp.'s production at Endicott, N. Y., was predominantly electromechanical data processing units.

Then automation and technology dictated a production change to electron tubes and more recently to solid-state electronics. The changes virtually eliminated 400 jobs. IBM followed its policy of home growing its talent. Result: Endicott employment is 6500, as high as it was eight years ago despite automation; its people have jobs requiring higher skills; and pay is better.

"But the individual by himself is not able to cope with automation and technological change," says O. M. Scott, president of IBM's General Products Div. Endicott maintains a school, run by 18 professional instructors, which employees can attend 8 hours a day for 20 weeks. The school is supplemented by short term classroom training programs. In addition, employees can participate in on-the-job training, afterhours educational courses, educational assistance programs at local schools, and paid graduate programs or educational leaves. The 400 displaced employees found other jobs at Endicott via the system.

This year, the Endicott plant will spend more than $500,000 training personnel to use new tools or to work on new products.

In one department, where the final test of solid-state computers is made, the Endicott plant was able to fill 75 per cent of the jobs with employees who had little or no background in electronics three years ago. In another department, an all-enclosed automatic line replaces a manually operated plating and etching area. Operators who run the line are technicians, not the semiskilled workers formerly needed.

"Automation has created a new level of technician in the company," says Mr. Scott.

Nine out of the ten industrial leaders in employment increases are also the same nine leaders in the rate of increase in capital investment.

The moral:

We can't afford to slack off in our plant and equipment outlays. We must increase them. We must boost our output per manhour because it is the basis for growth in jobs. The National Bureau of Economic Research and Rand Corp. agree that 90 per cent of the gains in manhour output come from technological advances. Capital spending (which leads to automation) is the root of nearly all technical gains.

The U. S. Chamber of Commerce says: "Plant and equipment expenditures (valued at 1958 prices) just before World War II were running about $20 billion per year. Since 1950 they have averaged over $40 billion yearly. With the greater population and larger work force, it is expected that by 1970 the average annual requirement for plant and equipment expenditures will be in the neighborhood of $70 billion."

So we have our work cut out for us. The latest Department of Commerce-Securities & Exchange Commission estimate of capital outlays for 1961 is only $34.5 billion.

Jobs Around the World

We invest a smaller percentage of gross national product (GNP) in new machinery and equipment than any of the 12 other nations that are our principal industrial competitors. While we're investing little more than 5 per cent of GNP in new equipment, West Germany, Italy, Japan, Austria, Luxembourg, and The Netherlands are plowing back 8 to 10 per cent.

Here are comparable unemployment levels in 1960 (Belgium and The Netherlands figures are for 1959), as a percentage of the total labor force:

U. S.	6.8
Belgium	5.9
France	Under 1%
Italy	5.4
Japan	1.1
Netherlands	1.9
Sweden	1.7
Switzerland	Under 1%
U. K.	1.6
West Germany	Under 1%

With the exception of Canada, which faces a situation similar to ours, no major industrial nation has as high a jobless ratio currently as we have.

In fact, there is a proposal that some unemployed U. S. steelworkers go to West Germany to take jobs in the booming steel industry.

The explanation is that most of the rest of the world is growing faster than the U. S. Between 1953 and 1959, West European nations enjoyed a 25 per cent increase in their GNP compared with a gain of only 15 per cent here. They increased their gross fixed investment between 1953 and 1958 by 18.3 per cent, while we boosted ours by 16.6 per cent. Investments mean mechanization which leads to more jobs, a bigger GNP.

Walton M. Henry, executive vice president for Soabar Co., Philadelphia, maker of marking equipment, states the case for the typical company (or industry) that is automating: "Our automation is proceeding in truly evolutionary fashion, rather than in a revolutionary way . . . Our employment levels are gradually increasing. Our sales are constantly increasing. Our prices are being held as constant as possible. Without automation, prices would have to go up."

David O. Woodbury, a writer on engineering subjects, says:

"While automatic machines displace direct labor, they create more jobs than they destroy because they open up wholly new opportunities for a broader life and spark thousands of new demands . . . Those who view technological unemployment as a curse of scientific progress are looking backward, not ahead . . . The jobless thousands that automation is supposed to create will be those who cannot learn the new techniques fast enough . . . Those techniques result in better jobs if a worker can be equal to their challenge."

Workers can be helped in meeting the challenge. The remaining sections of this article show how.

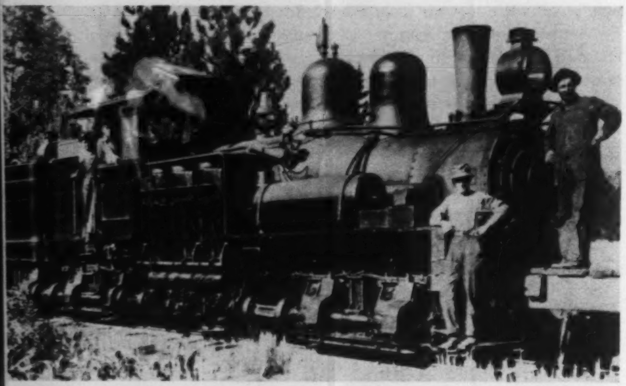
• Bound reprints of the study on Automation and Jobs are available at $2 a copy; prices for larger quantities on request. Write Reprint Dept., STEEL, Penton Bldg., Cleveland 13, Ohio

Automation Cannot . . .

Boost Jobs if Unions Restrict Gains

Crack equipment like this, must operate . . .

Under restrictions designed for equipment like this



The New York Central's crack passenger train, *The 20th Century Limited,* leaves Grand Central Station at 6 p.m. Sixteen hours later it pulls into Chicago. As it whizzes through the countryside of five states, some of the most automated facilities in America are at work to make the trip as safe, efficient, and economical as possible.

Two train crews could handle the entire run. Three could do it with ease. Yet, the rules call for eight sets of engineer and fireman, plus three of conductor and two brakemen. Each crew gets a full day's pay. The practice goes back to when less powerful engines, frequent stops for fuel and water, and lengthy waits for a clear track made a distance of 100, 150, or 200 miles a sound basis for a day's work.

That's not an isolated example. It's duplicated scores of times each day on freight and passenger runs throughout the country. And it's symptomatic of what's behind the plight of the lines—union featherbedding practices and antiquated state and federal regulations keep the rails from realizing the full benefits of automation.

All major Eastern lines, our biggest haulers, will go millions of dollars into the red this year. The railroads estimate featherbedding costs them $500 million yearly, more than enough to turn every carrier in the country into a profitable operation.

Railroads have attempted to offset losses through automation. They have automatic freight reclassification yards where incoming trains are "broken up" and new trains are formed. Automatic signaling devices, pushbutton traffic control, and mechanized track laying, are other examples.

But labor costs stay up. The railroads' payroll last year hit $4,893,558,158 compared with $4,620,518,211 in 1950, even though employment dropped from 1,220,784 to 780,494 during the period.

Hear Secretary Goldberg's Views on Automation

"IT MAY BE NECESSARY to step up the pace (of technological progress) rather than tone it down," says Labor Secretary Arthur J. Goldberg: "We in the Department of Labor regard automation and other technological advancement as essential and desirable developments for maintaining the strength of the U. S. economy."

He sounds the keynote of the federal government's view when he says no one should blame management for automating because industry must become more efficient. But he believes that industry must be convinced that the problem is too big for it to handle alone. It would bankrupt some companies, he notes, to carry the burden of the full impact of automation on their workers. He advises that industry work with government and labor to solve the problem.

Secretary Goldberg criticizes businessmen who fail to realize the broader problems resulting from automation—those who fail to attach the same importance to the sociological problems as they do to the technological benefits.

Supporting the Treasury Department's tax credit plan for increasing investment in new equipment, the secretary believes that "investment will ultimately assure more jobs and enable us to meet the competition for world markets." He also seeks faster economic growth, pointing out that for every $10 billion increase in gross national product, we create about 1.3 million jobs.

"Labor, for its part, must meet management halfway," says Mr. Goldberg. "It must abandon restrictive practices," he asserts. He adds: "Both sides must think out the operations of seniority systems. Both must concentrate on devices to increase labor mobility."

Mr. Goldberg says state and local governments "must be ready with plans and projects for the development of their own economic lives. They must be sure that their facilities are adequate to educate young men and women to the needs of a technological society."

What's Government Displacement Role?

A SURE WAY to start an argument is to suggest how you think the federal government—or any other government—should help to solve the unemployment problem. The fact that you think the government should do something will start a fight in some quarters. And you'd have to draw up a mighty long list of government programs before you would satisfy such people as Joseph A. Beirne, president, Communication Workers of America, and James B. Carey, president, International Union of Electrical Workers. They want everything from a legislated reduction in the workweek to a long range public works program.

Most businessmen probably take a view similar to that of Emerson Schmidt of the U. S. Chamber of Commerce. He says that employers, the workers themselves, and society at large share the responsibility for retraining displaced workers and providing some income maintenance.

The most practical distribution of the burden probably can't be determined at this time. Dr. Schmidt says the employer should not be so heavily burdened that economic growth and progress are deterred. He says the displaced worker should not be so heavily burdened that he will try to block technological progress. He says the residual burden must be borne by society at large—in practice primarily by local and state governments.

Whether or not you agree with the principle, the federal government will play an important role in solving structural unemployment problems. The Kennedy administration is directing a two-pronged

Seymour Wolfbein heads a new . . .

Office To Facilitate Change

ON APR. 20, Labor Secretary Goldberg established the Office of Automation & Manpower and appointed Deputy Assistant Secretary Wolfbein as its director.

It was a significant illustration of the government's role in facilitating technological change. The appointment of Mr. Wolfbein to the post indicates the importance attached to this task. He is one of the Labor Department's most capable men. The goals of the office indicate the federal government's effort to accomplish the dual role of fostering change while mitigating its human problems. The creation of the office is also an overt recognition of the problem.

In a talk with STEEL editors, Mr. Wolfbein spelled out these roles of his office:

1. To Inform—He plans to establish an "early warning system" in the automation area. He hopes that management will tell him in advance about the kinds of technological changes they plan to make. With that knowledge, his office will be able to alert people to upcoming changes in skill requirements and the geographical shift of industry, so that individuals will be better able to prepare themselves for useful work in a technologically advanced society.

2. To Communicate—"It's amazing how many people have already come here to find out what others have done about this problem," says Mr. Wolfbein. His plan is to make his office a clearing house of information on methods that can be used to ease the problems of shifting into automation.

3. To Mitigate—The office plans to study the problems of people already affected by technological change, so that it can recommend ways to help them re-establish themselves.

4. To Prevent—Mr. Wolfbein wants to stimulate industrial efficiency, but at the same time lessen the impact on the worker. This means his office may seek ways to lower the resistance to change—and ways to point up the importance of assisting the displaced worker before he is displaced.

To accomplish that fourfold purpose, the office will develop programs for improving testing, counseling, training, and placement of workers affected by technological change. It will hold conferences with employers and workers, and it will prepare informational material on ways to solve their problems. It will use the resources of other offices and bureaus in the Labor Department. The office, now mostly a "think shop," is scheduled to be upgraded to bureau status as its programs move forward.

Aiding the office is an advisory committee composed of 24 leaders in government, industry, labor, education, and industrial relations (including Roger Bolz, publisher of Penton's *Automation*).

Mr. Wolfbein's office is open to all who want help in solving the human problems of technological change. It's also open to suggestions, Mr. Wolfbein adds.

attack at it: 1. Encouraging more investment by industry. 2. Establishing programs to improve the geographical and occupational mobility of displaced workers and to cushion their financial blows during the transition. Some of these programs have been given the Congressional O.K. Others are in committee. Some are in operation.

On these pages, you'll find exhibits explaining a few of the more important programs. Let's take a quick look at some other significant steps being taken by federal, state, local, and foreign governments.

• **Stimulus**—Harvard's Dr. John T. Dunlop believes that "probably the single most significant role which public agencies can play . . . is to provide a stimulus and act as a catalyst to encourage labor and management to develop . . . the policies to cope with problems of adjustment to technological change."

At least two government groups have been created in that role. One is the Office of Automation & Manpower (Page 72). The other is the President's Advisory Committee on Labor-Management Policy, which has recommended these steps: 1. Design education and training to supply youth with necessary skills. 2. Establish procedures, probably through government offices, to predict what skills will be needed. 3. Improve the federal-state employment service. 4. Develop broad new retraining programs to give workers marketable skills. 5. Revise state unemployment compensation systems so that they encourage, rather than prohibit, retraining. 6. Study ways to assist workers in relocating and help such workers to retain employee rights, such as pensions.

- **Package**—President Kennedy is asking for a three-part package to attack the problem. Included: 1. An area redevelopment program, already approved by Congress and in operation. 2. A $275 million pilot program to train new entries into the labor force. 3. A retraining program for workers already unemployed, involving on-the-job training (where the government would supplement employer payments) and vocational training in schools (where the unemployed would be partially supported by federal funds). The Committee for Economic Development, a private group supported by businessmen, has proposed a retraining program nearly parallel to the Kennedy plan. And a Republican committee led by Rep. Thomas B. Curtis (Mo.) has suggested a retraining and relocation program that differs from the administration proposal more in detail than in effect.

- **Encouragement** — The Commerce Department hopes to sell Congress on a program to: 1. Provide government insurance for loans made to finance capital equipment purchases. 2. Gather and disseminate information on the methods of improving production efficiency.

- **Start Early**—Another Congressional committee has called for a specific and broad program to promote secondary and higher education. It is generally agreed that our schools are lagging far behind the needs of the business community.

- **Better Data**—The Bureau of Labor Statistics will begin gathering more data on productivity, unemployment, and the various causes of joblessness.

- **Job Aid**—The administration is backing a plan to revamp the U. S. Employment Service—give it a better qualified staff, offer a broader service, assist in testing and counseling.

- **Lesson from Belgium**—The Belgian government, in a joint effort with the High Authority of the European Coal & Steel Community, is attempting to retrain coal miners for jobs in construction and in plants making glass, corrugated containers, beer, cellulose, and other items. The experiment has shown that retraining works if the worker is young

REP. E. J. HOLLAND
(D., Pa.)

Subcommittee Wants Four Point Program

After six weeks of public hearings—the testimony covers 793 pages—the House Subcommittee on Unemployment and the Impact of Automation, chaired by Rep. Elmer J. Holland (D., Pa.), recommended a four-point program to cope with technological unemployment:

1. **Training**—"There should be encouragement and assistance for unemployed persons who are qualified and willing to undertake further education."
2. **Retraining**—The federal government should financially assist states to retrain persons displaced by automation.
3. **Job Finding**—The U. S. Employment Service should be improved: A. By expanding the counseling service and providing better testing and research facilities. B. By distributing more widely the Labor Department's "Occupational Outlook Handbook" to qualified institutions for use in counseling young people. C. By providing money for the Bureau of Labor Statistics to develop information on the severity of unemployment on families and individuals in terms of earnings, living standards, and other qualitative factors. D. By encouraging the Bureau of Labor Statistics to develop measures of our unused supply of labor, including a study of persons employed at jobs below their potential. E. By improving economic statistics for those unemployed due to structural shifts in the economy. F. By learning more about the mobility of unemployed workers. G. By expanding the guidance and counseling program of the Department of Health, Education & Welfare. H. By asking businessmen to co-operate with the Labor Department in developing a system to predict the kinds of technological change that should be anticipated and for which the economy should be prepared.
4. **Improving Mobility**—Permanently unemployed or technologically displaced workers should be encouraged to move to areas where jobs are available.

- **Dissenter**—Rep. Donald C. Bruce (R., Ind.) was the only committee member who refused to sign the report. He thinks tax realignment is the best answer to unemployment.

EMERSON P. SCHMIDT
Director of economic research,
U. S. Chamber of Commerce

What Should Government Do?

"The most promising long run approach to solving structural unemployment lies in private and public policies that mitigate recessions and stimulate optimum economic growth under competition, flexibility, confidence, and price level stability."

Dr. Schmidt suggests an improved flow of information, including: 1. Data on current job openings, by skill, number, and locality. 2. Use of the data by the federal employment service and other employment agencies. 3. Advance notice by employers of plans for mechanization or automation which would displace many people, combined with announcement to the workers of the alternatives available and the steps management will take to help.

He also favors better training, including: 1. Improving vocational counseling. 2. Restructuring vocational curricula to train workers for the skills of the future. 3. Expanding efforts by employers and unions to retrain workers on a continuing basis as a means of averting skill obsolescence.

Dr. Schmidt says we must lower these obstacles to labor mobility: 1. The sacrifice of seniority rights and other benefits by changing employers. 2. High relocation costs. 3. Barriers to the re-employment of older workers.

He says we need more cost flexibility, including the reduction of wage cost rigidities introduced by statute or decree, the adaption of collective bargaining to the special needs of depressed areas, and moderation of union positions on work rules and featherbedding to minimize artificial inducements to substitute machinery for labor and facilitate technological progress that is soundly conceived.

To speed the economic growth rate, says Dr. Schmidt, will demand: 1. Effective fiscal policies to prevent unsustainable booms and reduce the severity, duration, and frequency of recessions. 2. Stimulation of new investment, particularly venture capital, through tax reforms. 3. Stimulation of research and development.

enough and capable enough to learn new skills, but that it's not practical for many displaced workers. More than 100 have been successfully retrained.

- **Lesson from Sweden**—In Sweden, the unemployment rate is only 0.7 per cent of the work force—due to high economic activity plus what Seymour Wolfbein describes as "an active labor market policy." Sweden is experiencing a tremendous uptrend in its metalworking industries and is retraining—on modern machines—workers from other industries for metalworking jobs. Also, the Swedish government's employment service has an unusually high status and is extensively used by both labor and management.

- **Lesson from France** — To encourage industrial growth, and thus employment increases, France has established a system of tax incentives, including the exemption of regional development corporations from 50 per cent of the tax normally due on investment income. And accelerated amortization is permitted for certain types of plant and equipment.

- **Local Programs**—Massachusetts has a program to retrain workers. It is a success. Example: Furniture workers learned welding and were immediately employed; so were women textile workers who learned electronic assembly. The state also conducts technical training for high school graduates in 12 areas.

- Buffalo—A Mayor's Committee is researching the demand for skills and seeking to find out how many unemployed can be retrained. Part of the program involves a survey of 1958 high school graduates to see how closely their jobs are related to their high school training.

- California—A thorough study of all present educational and training programs in the San Fernando Valley resulted in these recommendations: 1. Both schools and industry need to upgrade their programs—after they better define their needs. Schools should meet the total educational needs of the society they serve. 2. There should be increased interemployment between industries and schools. 3. Education must co-ordinate better with industry.

- Ohio—The state has approved a Worker Retraining Committee to encourage, promote, devise, and assist the expansion of training programs for unemployed persons.

- Illinois—A 37-man rescue team will examine the state's labor supply, demand, training and education facilities, placement facilities.

- Pennsylvania—Five metalworking firms, a union, and government agencies are working to retrain 600 jobless autoworkers in Chester, Pa., for jobs in other area plants. These semiskilled people are middle aged.

- Arizona—Studies in Tucson have been made in an effort to predict what skills will be needed.

- Los Angeles—This city has a training program under which welfare agencies pay tuition and transportation and arrange for child care while mothers of needy children attend classes to learn skills.

- Colorado—The public school system is used to

A Community Attempts to Revive Itself

Under plan by David L. Francis . . . jobless workers learn new skills

WHAT STARTED AS a crash program to cure unemployment problems in West Virginia and Kentucky may become a federal pilot plan.

Proposed is a sweeping vocational training scheme to give new skills to 15,000 annually in West Virginia and 10,000 in eastern Kentucky. The plan, devised by David L. Francis, president, Princess Coals Inc., Huntington, W. Va., and former mayor of that city, is supported by the governors of both states and by leaders in education, business, and labor. It includes:

- A pilot training program—with 500 students to begin this fall—at three vocational schools. It would test the feasibility of training unemployed miners (Welsh, W. Va.), marginal farmers (Paintsville, Ky.), and production workers (Huntington).
- Establishment of a series of vocational schools in strategic areas.
- Double shifting school sessions, giving high school youths stepped up vocational training in one shift and rehabilitating unemployed workers in another.
- Expansion of counseling, aptitude testing, and referral procedures by employment offices to assure that retrainable jobless workers are given marketable skills within their abilities. Mr. Francis also urges increased counseling and testing for youth.
- Financial assistance for the unemployed while they're in vocational schools. Mr. Francis recommends a $50 weekly minimum. Noting that some states prohibit persons from receiving unemployment compensation while attending school, Mr. Francis asserts: "This is inconsistent and must be changed."
- Providing loans or grants (up to $600) to ease financial burdens during retraining, relocation, or job seeking.

To finance the programs, Mr. Francis looks to these sources: 1. State funds, perhaps partially via reallocation. For example, Mr. Francis points out that public works programs help fewer people than retraining does. 2. Federal aid. The Area Redevelopment Administration has already approved an overall Economic Development Plan, clearing the way for submission of project applications to Washington.

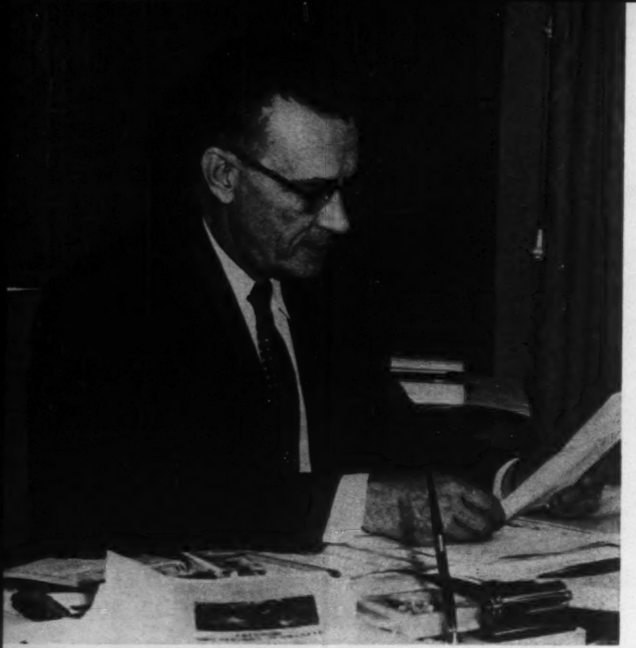
Says Mr. Francis: "There is no single solution to unemployment in distressed areas. Unfortunately, most of the solutions suggested are of a 'pump priming' nature . . . temporary stimulants which, when turned off, allow the area to drop back to its original distressed condition. Nor do these always reach down to the unemployed person. A second form of solution is the effort to bring new industries into distressed areas by such aids as special subsidies, moratoriums on depreciation rates, and tax breaks. This is a slow and uncertain process."

Mr. Francis thinks the best, long term, solution is to upgrade the area's potential by improving educational levels.

Some progress has been made: West Virginia's unemployment has dropped from 16.5% in January to 11.7% at midyear; eastern Kentucky's has dropped from 37 per cent in January to 29.4 per cent at midyear.

train people for jobs ranging from drill press operators to beauticians. Of 200 trained last year, most have jobs; 300 are in training this year.

- New York—Last year, 45,000 persons were upgraded in 85 job categories. More than 50 communities have trade and technical classes; 16 communities offer pre-employment training programs. The State Education Department has appointed industrial education staff consultants to each of the local and regional industrial development corporations established throughout the state. And the department maintains experienced staff specialists in each of the major occupational categories to assist local schools and other groups in establishing retraining programs. This fall, the department plans a co-operative venture with local school officials to inventory training facilities in the state.
- Connecticut—This state's community program for unemployed workers seeks to train people for existing job opportunities in an immediate area. The first class of 15 recently completed a six weeks' course.



As a unionist views his role . . .

"If we're not prepared to do the work that advancing technology demands, we'll be forced to the sidelines and become electrical laborers!"

That's the admonition unionist H. Lee Bruns uses to encourage members to keep pace with electrical technology via training courses. Mr. Bruns is director of apprenticeship and training, St. Louis Local No. 1, International Brotherhood of Electrical Workers.

Automation and advancing technology have created some displacement among workers, but Mr. Bruns believes the biggest impact has been in the number of jobs created which require greater skills. He sees better educational backgrounds and training opportunities as keys to helping workers cope with the changes automation creates. He feels the unions have a definite role:

1. **They can work at the community level in helping to upgrade educational standards and facilities. For example: He thinks elementary grades need attention.**
2. **They can counsel students in high schools.**
3. **They can assist communities in establishing educational opportunities for workers to upgrade themselves in their skills.**
4. **They should co-operate with management in the establishment and operation of apprentice programs.**
5. **They should provide guidance and encourage members to keep pace with changing technology in their skills.**

What Should Be The Unions' Role?

ASK TWO union leaders, two metalworking managers, and two employees that question and chances are you'll come up with six different answers.

Here's why:

1. Some unions, like the United Auto Workers and United Steelworkers, are fighting membership declines. The employment of hourly workers is on a down slope, but automation is only one cause. Recessions and foreign competition in domestic and world markets are the primary factors.

The unions espouse a self-protectionist role. They cry for concessions like a shorter workweek with no reduction in pay, more paid holidays, earlier retirement, and sabbaticals to spread jobs.

The unionists are also pressing for an expansion of the government's role: Create retraining programs, provide for worker relocation expenses, expand social security and unemployment compensation. They also want expanded government programs in housing, highways, hospitals, and recreational facilities to make more jobs.

2. For a few unions, automation has meant more jobs and more members. So they have different problems—training workers to fill new jobs, helping journeymen keep pace with technology.

These unionists see their role as one of working with management to set up apprentice programs, helping to set up community centers where workers can get advanced training, and encouraging members to avail themselves of the new opportunities.

3. Metalworking managers are in two camps.

- One group maintains: The less unions have to do with the over-all problem, the better. Reason: Most solutions will involve costs to industry or the government. Why dilute the funds by bringing in a third party?
- The other side believes: The problems involve both unions and management. So unions must cooperate with management in such areas as: Retraining, fostering apprentice programs, abolishing obsolete seniority and job description provisions in labor contracts which dilute the benefits of automation, and—most important perhaps—spreading the word about the need for more automation, higher productivity, greater pride of workmanship.

4. The employee's view is tied directly to his experiience with automation.

Spotlight on the Contract

Management can be assured of one thing: It will feel greater pressures at the bargaining table because

Two managers take opposing sides . . .

"Labor and management are in this together.

"Fewer jobs are the inevitable result of lagging production efficiency. A union will do the most good for its members if it helps a company compete with rival industries and with smart, aggressive, and highly mechanized, foreign competitors," says Kempton Dunn, president, American Brake Shoe Co.

"Local, state, and federal governments can help train displaced workers to fill new jobs, and more importantly, can do much to foster a climate in which business can create those jobs. The only real cure for joblessness is to keep the nation's industrial growth curve heading up.

"In the long run, mechanization has created many more jobs than it has eliminated. The long run problems will be solved before they become serious.

"The short range problems are another matter. We believe that a company's first objective in solving them should be to increase its efficiency and volume. Everything that can be done in this direction will create new jobs. Everything that is done to hinder it will only make the unemployment problem more serious."

Unions should have no part

"Anything that organized labor does will cost money—and where does that money come from? There is only one place, and that is from the manufacturer," says O. H. Menke, superintendent, Hobart Bros. Co., Troy, Ohio.

"I think the manufacturer should spend that money himself and accomplish more than to pay it to the labor unions . . . (they'll probably spend only) a small percentage of it for actual educational work."

of automation. Few, if any, labor leaders are publicly opposing automation per se. But the costly compromises they seek could negate the benefits of automation and retard the evolutionary process.

David J. MacDonald, United Steelworkers president, echoes the sentiments of most labor leaders: "Technological change is not new in the steel industry, nor is technological unemployment. Many thousands of steelworkers lost their jobs in the decade following the introduction of continuous rolling mills in the late 1920s. Only a sharp reduction in the workweek kept even more thousands from being permanently displaced. A further reduction in the workweek represents the major surgery needed!"

A. J. Hayes, president, International Association of Machinists, outlines these goals in dealing with automation:

1. Management should give advance notice and consult with the union whenever it is planning major changes.
2. Employees should have the right to transfer to other jobs within a plant and to jobs in other plants as well. Adequate moving allowances should be granted, including living expenses and losses resulting from the sales of homes.
3. Training for new jobs or existing jobs should be provided at full pay and no expense to the worker.
4. If a worker is downgraded, his former pay rate should be preserved.
5. If a worker is displaced, a substantial part of his income should be preserved via such things as severance pay, unemployment benefits.
6. Early retirement with an adequate pension should be provided.
7. Insurance and other benefit coverage should be continued during layoff periods.
8. New job classifications and rates of pay should be negotiated when automation increases skill requirements, responsibilities, or imposes other additional demands on the worker.

The late Clinton S. Golden, former USW vice president and one of the early organizers of the steelworkers, proposed a four point program—but little has come of it. His suggestions:

- The union could determine how many workers eligible for retirement are prepared to take the step, then help them secure pensions and other retirement benefits.
- The union could find out how many employees want to seek other jobs, then arrange for such things as severance pay and unemployment bene-

'Such a Small Expense Produces So Much Good'

Whitehead & Kales' president, Neil McMath, left, and United Steelworker Director Charles Younglove of District 29 look in on a company-union sponsored training class

"Such a small expense produces so much good." Both management and the union are saying that at Whitehead & Kales Co., Detroit. A training program suggested by the union has boosted productivity at least 25 per cent since the first of the year, estimates M. J. Larocque, personnel manager for the producer of auto carrier units for trucks and railroads and other structural fabrications.

"We did something any small company and union local can do to help themselves," says Maurice L. Halstead, president of United Steelworker Local No. 2341.

Last spring, when W&K's employment dropped to 165 from a normal 800 to 900, the local suggested training the laidoff workers. It volunteered to bear part of the expense of a program.

The company bought the idea and adapted a regular night-and-Saturday training plan it had been offering for years. Six of its supervisors—four as instructors and two as advisers—were put on detached service to teach classes in welding, structural blueprint reading, and burning.

The whole program was voluntary, but so many applied that acceptance was put on a seniority basis. The "students" (about 150) took the courses, meeting 3 hours a day, five days a week from Apr. 25 to May 24. By that time employment had climbed back toward normal, but the program will be presented again if extensive layoffs are necessary.

BENEFITS:

1. **It upgrades the workers.**
2. **It gives them a goal and something constructive to do during a layoff.**
3. **It boosts productivity.**
4. **It gives constructive work to supervisors who might otherwise have to be laid off.**
5. **Expenses (all borne by the company) were minimal, consisting of supervisors' salaries (some of which would probably have been paid anyway to keep good men) and small sums for materials.**

fits. Some managers have expressed interest in this proposal, believing that there are certain workers who would like to change jobs (even move to other industries) if they are given the right kinds of assistance and encouragement. Such a system might be preferable to present seniority provisions in dealing with the worker dislocation problem.

- The union could try to arrange with management that severance pay, wages paid during employee training, and related expenses be calculated as part of the cost of new installations and amortized.
- The union should negotiate new wage rates consistent with upgrading and larger responsibilities.

Unions' Training Role

Most managers, educators, and civic officials STEEL contacted agreed that unions apparently view their role as chiefly an advisory one. There are some exceptions.

Unions are participating in education and training programs that prepare members for new jobs and help cushion the impact on displaced workers.

The International Brotherhood of Electrical Workers is active in such programs. Says Gordon M. Freeman, president: "We have been encouraging apprenticeship and training programs for our journeymen since 1946-47 when the term electronics was becoming prominent.

"Our brotherhood set up a national school in co-operation with Marquette University. Representatives from IBEW locals in all parts of the country attended electronics classes and returned home to conduct courses for members in their own locals."

Mr. Freeman estimates that in addition to more than 18,000 apprentices, about 75,000 IBEW members in the U. S. and Canada are taking part in the union's skill improvement programs.

IBEW member H. Lee Bruns (Page 76) believes unions should assume a major role in education and training.

Schools Need Help

"One of the problems the skilled trade unions face," explains Mr. Bruns, "stems from some of the traditional thinking in our educational system. Example: When youngsters in the low achievement group can't make the grade, teachers advise: 'Go to a vocational school and learn a trade.'

"Standards must be raised," he stresses. "How can educators expect such students to get through courses on alternating current machinery, electrical mathematics, fundamentals of electricity, and electrical instruments? As technology advances, we're competing more and more for students with the ability to go to college.

"Part of the over-all problem stems from practices in today's elementary schools. Children are promoted from grade to grade for social and age factors, not scholastic achievement. By the time they reach high school, the damage has been done. Union leaders and their members can play an active role in their communities by trying to remedy this situation."

The other part of the problem, the IBEW member believes, is to encourage journeymen to keep pace with changing technology and help provide facilities for such training.

The union and educators in St. Louis set up an advanced electrical training program at O'Fallon Vocational School last year. Nearly 300 are enrolled in courses scheduled two nights per week for 30 weeks. The student pays his enrollment fee. It takes four years to complete the program.

"We needed 25 instructors," relates Mr. Bruns. "To get them, we got on the telephone and went down the list of journeymen until we found the qualified people. Sometimes these people will not be practicing their skill, but will still be maintaining union membership. Example: One of our full time instructors is a teacher working on his masters degree, another is working toward a degree in electrical engineering." Mr. Bruns point: Unions can find the teaching talent for such projects within their own ranks.

The IBEW is also stressing national standards in its training programs, so journeymen hired anyplace in the country will have the same skills.

"An important element in the unions' role in such programs is one of survival," admits Mr. Bruns. "If we don't do the job and help our members keep pace with technology, the skills will come from somewhere else, and we'll be downgraded to electrical laborers."

Co-operation Pays Off

In Los Angeles several years ago, the California Walnut Growers Association announced it was moving its operations to Stockton. About 600 workers were involved, 400 of whom were women who sorted and graded walnuts. Many of the workers

Union leader has this . . .

Challenge to the Worker

"He must shake himself loose of all traditional concepts of immobility, both geographically and with respect to job content.

"He must be willing and eager to accept retraining . . . and, if necessary, move from one geographical area to another. This is a difficult thing to ask, particularly of mature workers, but the economic problems created by automation will not be met unless this degree of co-operation is obtained from workers affected."

JOSEPH A. BEIRNE
President, Communications Workers of America

'Get Your Head Out of the Sand, Man . . .'

That's what Harold J. Ruttenberg, industrial consultant and former research director of the United Steelworkers, told a USW staff representative recently.

Mr. Ruttenberg had asked him how many plants were in his district. "Six," he replied, "but there used to be seven." Why the reduction? "I don't know," the union leader answered. "I guess they just couldn't take any more of me. They went down to South Carolina, where they said their labor rates would be 20 per cent lower."

The USW staff man expressed little concern ("I've only got three years to go to retirement") but Mr. Ruttenberg believes the trend is dangerous to the union, its members, and the economic health of many industrial communities in northern states.

"The United Steelworkers are adding to their automation woes by taking an inflexible stand on wages and benefits," says Mr. Ruttenberg. "By insisting that every employer follow the area wage pattern set by Big Steel, they force companies that can't stand the gaff to move out. What's more, they make it impossible for community leaders to attract new industries that would provide jobs for dislocated steelworkers.

"The United Steelworkers are going to have to learn what the United Auto Workers learned long ago—that saving jobs is more important than saving face. The UAW has allowed some automotive suppliers in the Detroit area to deviate from industry wage patterns. It has recognized the importance of keeping jobs in Detroit. It knows full well that its members would rather stay on the payroll—even at reduced rates than be forced out and lose their retirement benefits. The UAW won't subsidize weak management, but it's realistic. It insists on three things—that management tell the truth, be responsible, and be competent."

faced with the prospect of seeking new jobs were handicapped by age (40 per cent were over 40), had language difficulties, or lacked experience in other fields.

To solve the problem, California's Department of Employment convened with officials from garment-making companies, representatives of the Brotherhood of Teamsters, and International Ladies' Garment Workers Union, and officials from technical schools.

A nine week course in power sewing machine operation was developed for 65 walnut sorters. Arrangements for the transfer of union memberships from the Teamsters to the ILGWU were made.

Result: 55 of the walnut sorters secured jobs as power sewing machine operators, and ten were placed in other employment.

Some union leaders feel that their organizations can lend a hand by helping to promote their industry's products as a method of expanding markets. The Glass Bottle Blowers Association (GBBA), which has a membership of about 54,000, has consistently conducted public relations and advertising campaigns aimed at promoting the glass container.

The industry has had to stay abreast of technological advances to keep pace with competitive materials. "The union has endorsed every advance," says Lee Minton, GBBA's president, "because it recognizes that huge volume is most necessary to insure steady employment at fair and equitable wage scales."

Suggestions from Managers

E. Ralph Sims Jr., principal in E. R. Sims Associates, Lancaster, Ohio, has this to say about the union's role in the automation and jobs problem:

1. Unions can be more flexible in matters of seniority and job description. Management must be permitted to bring workers into a plant to let them learn new jobs. The work rules problems must be resolved before the full impact of foreign competition arrives. Example: The pottery industry faces extinction because union contracts spell out exactly how many cups a man can dip per day. The American laborer is competing with highly mechanized pottery plants in Europe and Japan, and he will not be able to save his job unless automation is introduced.
2. Unions should do more to foster development of apprentice programs. We have too many specialists today—needed are more well rounded men. In some cases unions are restricting apprenticeships.
3. Unions could do much in joining management to instill employees with pride of workmanship and skill. Trying to get the most for the least won't do as world competition gets keener.
4. Unions can modify their communications theme—much of their approach tends to undermine worker confidence in management's integrity and distort the impact of automation.
5. Unions can set up study committees to assist management in the introduction of automated equipment and in solving the job dislocation problem.

How Managers Can Create Jobs

"IT'S AS HARD for businessmen to define automation as for preachers to define sin," asserts Dr. Walter Buckingham of Georgia Institute of Technology, director of the House Subcommittee on Unemployment and the Impact of Automation.

Few words have been so twisted to suit a multitude of purposes and phobias. "Automation" has become a technological rallying cry, a manufacturing goal, an engineering challenge, and a labor campaign banner. The controversy reminds you of Humpty Dumpty's assertion to Alice: "When I use a word, it means just what I choose it to mean—nothing more nor less."

The result has been that many managers refuse to use the term—and refuse, at the same time, to recognize the concept's full implications. Says Arthur F. Vinson, vice president, General Electric Co.: "Management must recognize that automation embraces all the functions of a business . . . that an automation program is a step-by-step analysis of a company's products. It is up to management—management with vision, enthusiasm, imagination, and courage—to apply this way of manufacturing to their business."

If this nation is to continue as a technological and industrial leader of the world, management must automate. But at the same time, management must be willing to shoulder part of the human burden resulting from automation. What is, after all, management's job? To grow, to plan, to predict and inform, to train, to organize, to counsel. Let's examine those functions one by one in the automation context.

Grow We Must

By almost any standard you select, this nation's rate of economic growth is inadequate. If we were growing fast enough, new jobs would be created to absorb those persons displaced by automation and other forms of change. We would have no worries about technological unemployment.

Management must automate. That's one of the surest ways to increase productivity (thus lower costs and prices) and expand our rate of growth (thus increasing employment opportunities).

As Fletcher C. Waller, vice president, Bell & Howell Co., Chicago, puts it: "The first obligation of management is to contribute to the national strength by growing profitably." The firm's corporate goals illustrate the approach to growth:

1. To support future growth opportunities, every operation must be conducted profitably today and at a rate which will permit the self-financing of such opportunities.
2. To insure growth, the company shall primarily engage in research, manufacture, and marketing of products within high growth potential fields.
3. To stimulate a desire to grow, managers shall have the maximum freedom of action, consistent with predetermined growth objectives, policies, and performance standards. Appropriate financial incentives shall be employed.
4. To achieve growth, the needs of customers must be met through products and services of competitively superior value.
5. To maintain growth, all operations and func-

Here's One Executive's View Of Management's Responsibility

EDWARD L. CUSHMAN, vice president, American Motors Corp.

"The present rate of unemployment is intolerable, and steps must be taken to correct it.

"The fundamental remedial step is, I believe, to increase the rate of economic growth.

"To whatever extent it is possible to anticipate indefinite layoffs, management should advise employees and their union representatives of their prospects as far in advance as possible so they can plan accordingly.

"If practical, retraining programs should be inaugurated for senior employees . . . (who have) the aptitude for such retraining.

"Management should co-operate with public employment offices and with other managements in expediting re-employment of such employees.

"In an area of limited job opportunities, displaced workers should be encouraged to move. Consideration should be given to some financial assistance insofar as this is practical."

They Learned New Skills

Genesio Lanaro is now a welder

Theresa Therrien is a development tab operator

How GE Cushions Automation's Impact

"MANAGEMENT has an obligation to: 1. Insist upon technological progress, including automation. 2. Preplan the human side of automation as well as the technical side. 3. Assist employees displaced by automation, before they are displaced, to improve their occupational or geographical mobility. 4. Educate employees in the benefits of automation and help them to recognize the opportunities it creates."

That's how General Electric Co. summarizes management's responsibility to employees during the process of automating. And GE has put its money where its mouth is. The firm sponsors nearly 500 different training programs, at a cost of approximately $40 million annually. It also assists laid off employees in relocating.

The firm's Meter Dept. in Somersworth, N. H., illustrates the point. On the plant floor, you'll notice new automation systems being built and tested alongside the persons they will displace. Doesn't that destroy the workers' morale? "Not at all," says Clifford Miller, manager-employee relations. "We've found the reverse is true. At first, we built automatic machines in a separate room. It raised havoc. People are afraid of things they don't understand or can't see. Rumors about the 'monsters' we were building in that room hurt productivity. But with the machines out on the plant floor, we have no problems. The workers see exactly what they are and what they will do. They keep right on working."

Why the employees "keep right on working" is

tions must be managed through means which support a steady and optimal level of productivity.

Planning Is Managing

A rate of growth sufficient to absorb technologically displaced workers should be management's prime goal. But such a growth rate does not totally solve the unemployment problem. Methods must be found to ease and accelerate the re-employment of displaced persons. The first responsibility of management here is to plan and predict.

Emerson Schmidt of the U. S. Chamber of Commerce points out that "it is in the interest of the employer to give as much advance notice as possible when he is planning a technological change in the plant." To do it, you simply plan your manpower needs at the same time you plan the equipment change. For example, look at the plan GE has developed in Lynn, Mass. A special group, called "employment planning," is assigned to look six months to a year ahead and determine what the employment picture will be. The men examine all changes that will affect employment—such as market trends, new machinery, design changes, new materials. They predict work force levels and makeup. They analyze present skills and new skills that will be required. They have set up outside training programs to insure the availability of needed skills. The transition to automation is usually a that they know GE cares about their employment security. That was proved when they declined to be represented by a union at Somersworth.

And GE has seemingly been worthy of the trust. Take, for example, the Meter Dept.'s conversion of a magnetic suspension assembly line to automation. Before automation, 39 people were employed on the line; after automation, only 14 had jobs there. But not one of the other 25 was discharged—all were transferred to new jobs in the plant. Today—five years later—11 are still on those jobs; one has been discharged; seven quit voluntarily; two left for maternity reasons; three left for medical reasons; one died.

The reason GE has been able to absorb people displaced by technological change: Management plans its manpower needs at the same time it is planning equipment changes. In that way, normal attrition has taken care of displacements. "In fact, our experience shows that normal attrition removes many more people than are displaced by mechanization and automation, so we really must continue to hire right along," reports E. J. Kneeland (see photo).

GE believes that management should predict what skills will be needed and what will become obsolete, then prepare employees. "We try to give the employee the opportunity to keep himself in pace with technological change; it's his responsibility to avail himself of those opportunities," says Mr. Kneeland.

What are the opportunities? Ask Genesio Lanaro (photo). He used GE's Income Extension Aid Plan (launched in 1960) to pay the $730 cost of a 320 hour welding course and is now employed in the firm's Foundry Dept. Formerly a semiskilled worker in the firm's wire mill, he took the welding course while he was laid off due to a business slump.

Or ask Theresa Therrien (photo) about retraining opportunity. She started with GE in 1953 as a production worker, later qualified for officework, then took on-the-job training to become a development tab operator at the Meter Dept.

Another example: Franco Fusco, a laid off maintenance employee, went to Italy to study electronics. GE shelled out $1224.08 to help him.

At Erie, Pa., 400 GE employees are attending night school, on a share-the-cost arrangement, to learn new skills. Many of them are developing two or three skills to protect their employability.

GE also has a tuition refund plan under which it pays about $1 million annually to employees who go back to college.

Under the Income Extension Aid Plan, an employee has five options: 1. To enter a recognized trade or professional school. 2. To collect the amount of aid due him within 60 days of layoff, plus pension and other accumulated allowances, and use it as he sees fit. Example: To relocate. 3. To use the money as a substitute for unemployment compensation if he is laid off so long that his UC runs out. 4. At the end of a full year of layoff, collect the money in one lump sum.

That plan, and other GE programs, are aimed at a goal expressed by Philip D. Moore, GE's manager of employee relations: "As machines get more versatile, so must folks."

E. J. Kneeland,
Manager-communication operations in union relations, GE.

lengthy process, so there is plenty of time to plan.

The alternative can be unpleasant, as Detroit Edison Co. discovered. In automating its customer accounting and collecting, the 400 people closely associated with the new system were kept fully informed. The changeover was successful, everyone thought. But then a problem in another department was traced to the change. Employees in customer relations, who were not consulted, did not understand the reasons for procedural and policy changes that followed the installation, and their resentment led to the magnification of errors, accusations, challenging of procedures, and other frictions. Outside consultants found the problem was "insufficient communications and training . . . and inadequate opportunities to participate in the change and know what was going on."

Training Is Managing

The task of managing is essentially one of teaching, of developing people. So management is in a good position to undertake training programs, as indeed many companies already have.

The Bell System, for example, takes the responsibility for retraining employees displaced by automation. So do General Electric Co. (Page 82) and Inland Steel Co. (Page 84). R. H. Macy & Co. Inc. has signed a union contract with a clause that pledges the firm to retrain, at its expense, employees

How Inland Develops Brain Power

"MANY YEARS AGO, we shifted from back muscle power to finger muscle power in steelmaking. Now the shift is to brain power," says Frank H. Cassell, director of personnel administration, Inland Steel Co., Chicago. From mid-1951 through mid-1961, Inland changed over from outmoded pot operations to continuous galvanizing lines. Under the old method, the ratio of production workers to whitecollarites (including supervisors) was 7 to 1; with the automated lines, it is less than 2½ to 1.

While employment in the department has risen about 31 per cent, clerical jobs have increased 400 per cent, production maintenance jobs 333 per cent, administrative jobs 200 per cent.

"To ease transfers, we spent thousands of manhours checking with supervisors, interviewing workers, lining up transfers, and following up to see how transfers were working out," notes William G. Caples, vice president-industrial and public relations.

"In setting up qualifications for new jobs, the ability to speak, read, and write English and do simple arithmetic became a requirement for the first time. Twenty per cent of the men could not meet the new qualifications," comments Mr. Caples.

MANPOWER TRAINING—INLAND STEEL CO.

The men who chart the course of Inland Steel Co.'s massive yet individualized training programs are William G. Caples, vice president-industrial and public relations (left) and Frank H. Cassell, director of personnel administration

"There are no quick or easy solutions when you shut down or install lines," observes Mr. Cassell. "We prefer systematic, individualized, on-the-job training for specific tasks. Our training staff and operating managers develop instruction manuals for every job as new equipment is put in place. Then supervisors use the manuals in coaching trainees."

Does the system work? Two weeks after production was started on the new galvanizing process, production hit 100 per cent of capacity.

"If managements demonstrate to workers that better jobs result after retraining, employee acceptance will be high," says Mr. Cassell.

Mr. Caples comments: "More than 14,000 of our 30,000 employees received training in 1959." Inland's courses range from basic English for Spanish-speaking workers through advanced management programs at Harvard.

whose jobs are eliminated by machines, so that they'll be able to accept an equal or lower-rated job. The General Motors Institute has around 24,000 employees enrolled in its various training programs each year. The automotive industry has recently originated a massive effort, called "Project Automotive Technician," to recruit, train, place, and retain skilled mechanics. About 15,000 such jobs open annually. Ford Motor Co.'s Apprentice Training Program enrolls about 2000 employees annually for training in 26 skilled trades.

In addition to the hundreds of companies with formal programs such as those, other firms have entered into joint retraining efforts. Thompson Ramo Wooldridge Inc. joined in one with the city of Cleveland (Page 85). Armour & Co. probably has the most famous plan—and one from which several lessons can be learned: 1. Some displaced workers were not retrainable in the skills selected for the program; such persons, when displaced, may necessarily have to go back to grammar school—to learn to read and write. 2. Retraining programs are not successful unless the trainee can find a job in his new skill. 3. Union and management can co-operate to successfully retrain workers. 4. Displaced workers need counseling and guidance, much as do high school students. 5. A training program can be successful only if you know exactly what to retrain people for.

Some successful retraining is being done as the result of individual effort. Schools like American Technical Institute, Akron, specialize in training workers to become engineering technicians. The National Home Study Council, Washington, with 53 accredited schools, reports that more students are contracting for education by mail than the combined freshman enrollment of all U. S. colleges and universities.

Series of Solutions

Some other routes are available for management

Learn Two Lessons from This Retraining Plan

A retraining program in Cleveland teaches a two-pronged lesson:

1. Retraining is best accomplished through industry and government co-operation.

2. Retraining can't be considered a success until the trainees are re-employed.

Ten people, considered unemployable because their skills had been obsoleted, were trained under Cleveland's Learn-A-Skill Plan in which Thompson Ramo Wooldridge Inc. (TRW) worked with city, county, and state officials.

Last winter, the City Council recommended such a program. The mayor responded by naming a committee of the council. Within four days, TRW executives volunteered plant facilities and training departments.

"We had the programs readily available, and we considered it a part of our civic responsibility to add to the skills and capabilities of this industrial area," comments C. W. Robison, staff director, human relations, TRW. "If business and public agencies would work together on unemployment, much could be done to diminish the problem without resorting to the costlier method of setting up another federal bureau to handle it."

Seventy-five men were selected by the County Welfare Department for aptitude testing by the Ohio State Employment Service (OSES). Of those, 27 were chosen to receive 42 hours of instruction in a local high school in blueprint reading, shop arithmetic, use of micrometers, vernier scales, steel rules, and elements of machine shop practice. Twenty completed the course, and 12 were picked for 40 hours of on-the-job training at TRW with no pay. They worked in regular production jobs as molders, grinders, and operators of screw machines and multispindle drill presses. Two men voluntarily dropped out; ten got certificates of completion and received fine performance ratings from foremen and training personnel. Training ended June 9.

None of the trainees is employed.

"TRW couldn't hire them because it has men on layoff, and there is no demand for trainees in those skills," says E. C. Schulze, Cleveland manager, OSES. "In the near future, we'll conduct an area skill study, asking Cleveland employers what job skills they will need over the next ten years—then recommend training."

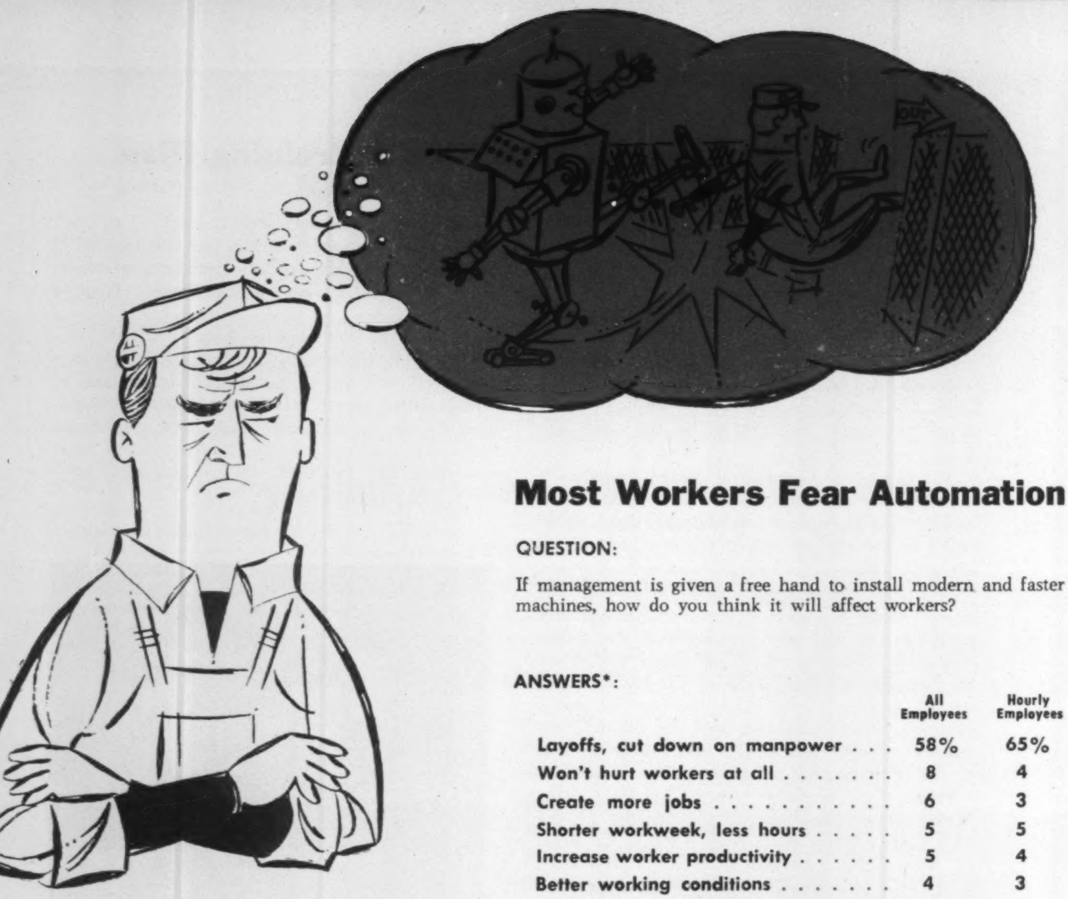
James Dawson, center, one of ten "unemployables" trained by TRW, learned pump body chucking in three days, mastered a 12 station wash, rinse, and drying machine in 2 hours, and later worked on a precision boring machine

to use in helping employees increase their occupational and geographical mobility. And there are other tasks management can undertake to improve employment stability. General Electric Co. offers this list:

- Consider employment stability in production scheduling and inventory control.
- Plan outside purchasing to avoid temporary peaks in employment that would be followed by sharp reductions.
- Make full use of normal attrition by reducing hiring in advance of a foreseen reduction in manpower needs.
- Install new production facilities in gradual phasing with the removal of obsolete equipment.
- Plan overtime to meet peak demands, rather than add employees who would not be needed later.
- Schedule vacations at times of slack demand.
- Schedule new model introductions throughout the year, not all at once.
- Train and transfer employees to other jobs.
- Keep good records of alternate skills available when needed.
- Use continued heavy investment in equipment to keep costs down so that the firm's products can compete in markets at home and abroad.

Aluminum Co. of America's policy is to give employees plenty of notice when changes are coming up, then to proceed slowly. Example: The firm started closing its East St. Louis, Ill., plant last year, will complete the shutdown early in 1962. As each department is closed, the firm attempts to find new jobs for young displacees, offers early retirement or severance pay to others. E. I. du Pont de Nemours & Co. Inc. has amended its pension plan to allow long service employees to retain pension rights even though they leave the firm.

Progress has been made. More seems needed. A Steel survey finds that only 12 per cent of metalworking firms have formal programs to retrain displaced workers. And only 1 out of 3 firms offers displaced employees any assistance in relocating.



Most Workers Fear Automation

QUESTION:

If management is given a free hand to install modern and faster machines, how do you think it will affect workers?

ANSWERS*:

	All Employees	Hourly Employees
Layoffs, cut down on manpower	58%	65%
Won't hurt workers at all	8	4
Create more jobs	6	3
Shorter workweek, less hours	5	5
Increase worker productivity	5	4
Better working conditions	4	3
Workers will be shifted around	4	3
There'll be some long range benefits	4	4
Workers have to work harder, faster	3	4
Higher wages, more benefits	1	1

*Survey done by Opinion Research Corp. for study on *How Management Can Meet the Problem of Changing the Work Rules.* Columns don't add to 100 per cent because miscellaneous items and "no opinion" scores are omitted. Some employees checked more than one factor.

How to Sell Automation's Benefits

"JIM, I WANT the seven people on that new line to earn at least 15 per cent more than they did on the old operation—regardless of how the job rating factors come out."

Those instructions were issued by the president of a small Ohio firm to his manufacturing manager when an automated facility was put into operation. Seven workers on the new line produce more than 16 did on the old one. Why the disregard for conventional rating techniques to price the new jobs?

"To sell my employees on automation!" emphasized the executive. "Half the jobs on the new line require less skill. All are physically easier, cleaner, and safer. But I had 280 other employees watching to see what happened. Nine of their fellow workers were dislocated. Fortunately, we were able to absorb them elsewhere, but here was an example of what they feared—automation was taking away jobs. I had to prove to every employee that automation really pays off for everybody, not just the company.

"First, it wouldn't take long for the word to get around about the pay rate on the new line. If possible, I wanted every worker in the plant to be standing in line for a job on the next operation we automated.

"Second, even with the pay hike and cost of the new line, I was able to cut the price of the product involved by 10 per cent. This will boost volume and affect several other activities in the plant.

"Third, we have a profit sharing program which is calculated and paid on a monthly basis. The increased volume and profits would show up almost immediately."

You may question the arbitrary establishment of the pay rate. You may argue with how the benefits of automation were divided. But you can't challenge that president's wisdom in recognizing that selling automation to workers is an absolute necessity.

Fear of automation is not new. In 1939, the Gallup pollsters asked people on relief: "What do you blame for the present unemployment in this country?" Increasing use of machinery was cited more frequently than any other possible cause.

Opinion Research Corp.'s survey in 1960 of 523 employees (384 hourly workers) in large companies demonstrated that the basic fear of automation still existed (see exhibit, Page 86). Several other interesting points were uncovered.

Question—Are you for or against giving management a free hand to install modern and faster machines? Hourly workers responded:

	Total	Union	Nonunion
Opposed	41%	55%	27%
Favor	40	30	51
No opinion	19	15	22

Two out of three of the workers interviewed had had a brush with a major technical innovation or drastic change in work routines. Of these, 58 per cent reported their experience was unfavorable; 42 per cent said their experience was favorable.

Reported ORC: "When it is favorable experience that has shaped his outlook, the worker recognizes the dynamics of progress, acknowledges management's right to make decisions, and looks for the long range gains in his job package."

Concludes ORC: "The key to influencing worker outlook on changes is demonstrating management's concern—first by deeds in handling displacements and second by communications, so that employees know what changes to anticipate, what effects are to be expected, and what's being done to cushion the impact."

When Do You Start?

The job of selling the advantages and necessity of installing more modern equipment obviously starts at the top. The time to start selling is after certain basic decisions, such as the selection of equipment and a target date, have been made.

A key man easily overlooked: The foreman. One plant manager commented that the foreman represented far more of an obstacle than the workers. He recommends involving the foreman early—get him to feel that it's "his" machine or line that's going in. Weave his ideas into the program. Send him to see the machine being built. Send him to other plants to see the equipment in operation. Some firms even get the foreman's O.K. on equipment prints and layout plans in the early stages.

The strategy puts enthusiasm at a critical point in your communications network—the first line of supervision. You'll be lucky if you can beat the grapevine when you announce the automation of a facility. If the foreman is enthusiastically primed for the move, he can do much to help sell the workers.

Many firms like General Electric "prep" supervisors on the types of questions which may arise and how they should be answered. Fletcher Waller, vice president-organization and personnel, Bell & Howell Co., Chicago, makes a good point:

"You should try to have the employees understand, if not agree with, the need for automation. Companies have to modernize, mechanize, re-equip, and automate to compete internationally. We strive to improve products, costs, and return on investment—and not lose sight of our responsibility to workers."

Sell Through Deeds

The credibility of your story will depend more upon what you do than on what you say. Auto-

Solve the Problems Together

"Securing workers' acceptance of a program for automation is difficult at best. It is a hopeless task unless it is done in a climate of confidence which has been built over a long period. Workers, their leaders, and management must be accustomed to solving difficult problems together.

"Long range planning must be carried out in connection with the changes arising from proposed automation. Every conceivable effort to reduce the impact upon individuals' jobs must be conscientiously thought out, and equally important, communicated to unions and workers themselves. The company that wishes to progress with consequently improved methods and equipment must be patient and understanding about the rate at which innovation takes place."

JOSEPH C. WILSON
President, Xerox Corp.

mation doesn't crop up overnight—management has sufficient time to prepare employees for the change.

Xerox Corp., Rochester, N. Y., began to see the handwriting on the wall in 1958. The choice was to automate its photographic papermaking facilities and diversify or lose ground to competitors.

Officials gathered facts, presented them to union leaders, then employees. The company knew it wanted to diversify further into the copy machine business, but it couldn't pinpoint all the employee skills it would need. It was reasonably sure that machine shop techniques and mechanical assembly skills would be required, so it offered to set up a retraining program for workers with ten or more years of consecutive service.

Training was given at the Rochester Institute of Technology for six weeks. Employees were paid their regular wages up to $2.50 per hour. Upon satisfactory completion of the course, the employees were temporarily assigned to job classifications determined by the company, with the understanding that they would be re-assigned as soon as jobs developed through normal turnover or the creation of new jobs.

"It's difficult to entice an employee who already has one skill and ten or more years' seniority to learn a new skill," officials explain. "But once we were able to prove the need and get them into the course, they became conscientious students. Sixty-eight men were retrained at an estimated cost of $1750 each.

"We haven't been able to put all 68 into the types of jobs they were retrained for—some are pushing boxes. But most of them have been relocated, and the employees who haven't get first crack at the new jobs when they occur."

Face Up to It

Here's another big reason why employees fear automation: Some managers are afraid to even use the term or talk about new facilities in terms of better productivity, the firm's competitive position, and the effects of increased sales. Too often unions throw the first punch: "Automation took away a job while creating greater profits." By the time management counters with "yes, but," the damage has been done.

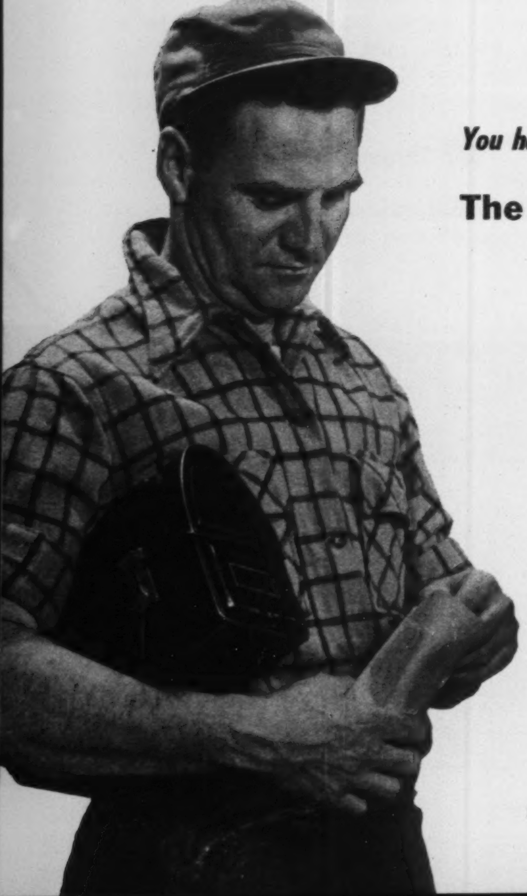
Inland Steel Co., Chicago, makes sure communications are aimed at four groups:

1. The employees affected—what their rights are under the terms of the labor contract and what additional steps the company is taking to cushion the impact.
2. The plant's supervisory force—notification of the facilities involved and enlistment of co-operation in holding vacant jobs open for displaced workers.
3. The union's officers—keep them informed of facilities affected and what the company is doing.
4. The community—to help drive home the importance of technology and change.

The Tools to Use

Take advantage of all the communications tools at your disposal to sell the workers, including:

Supervisor-employee meetings, bulletin board notices, company newspaper and magazines, letters to



You have to tackle . . .

The Worker's First Concern—Job Security

He will ask:

- **How many employees will be displaced by these new machines?**
- **How does the company plan to solve the problem—through layoffs, attrition, transferring workers to other departments or plants?**
- **Will I qualify to work on a new machine?**
- **What's it like to operate new, high speed equipment?**
- **What has been the experience of other workers?**
- **Is there anything I should do to prepare for the changeover—will my shift be changed so that I should look for another car pool? Should I postpone the purchase of that new car?**

the employees' homes, movies, notices to the union, tours of the new facilities, and speeches by officials.

The communications job has many facets. For example: GE has a guide for plant management that has four "basic messages" and suggests techniques for adapting them to local situations—perhaps you can use them too:

1. "Can America Stay in Front?" The threat of foreign competition and what it means to the individual is the message. Communications can be developed to fit your situation—such as sources of competition, products that compete with yours, the quality and price offered by the foreign plants, and how your efforts to improve productivity, quality, and design save U. S. jobs.

2. "Can We Produce a Higher Living Standard for a Larger Population?" This message explains the need to increase production at least 40 per cent by 1970 to maintain the improvement factor in our standard of living. The job must be done with less than a 20 per cent increase in the work force. So increased productivity is the obvious answer. You can show, for example, how production methods and products have been improved over the years, making it possible for more people to buy and use them.

3. "New Products, New Industries, New Jobs—from Automation." This message is designed to show how automation, by increasing productivity, raises living standards and helps to create new and better jobs. Use communications that tell about employees who are working on new products; the jobs created by the service industries which are needed to sell, maintain, and repair new products; the workers required to produce the nation's automation equipment; the training programs required and how employee skills are upgraded; and examples of job improvement in your plant.

4. "Obstacles—Or Opportunities?" GE's basic message is to point out that the firm's key to success is its ability to keep competitive by constantly modernizing methods and production facilities. Suggestions: Tell how research and development programs, plant and equipment modernization, and domestic competition are related to jobs.

Probably more than anything else, sincere demonstration of concern and understanding of the problems the displaced employee faces will help sell workers on the need for automation.

One company president puts a large part of the blame on middle managers who lack that understanding yet have a critical role in the communications problem:

"Middle management should perhaps think in terms of how they'll be reacting ten years from now—for automation is certain to catch up with many of their functions as well. Managers now concerned with the collection, sorting, and analysis of data most surely will be displaced by equipment which can do the job better, faster, and more accurately."

The real challenge rests with top management. Firms that are automating the fastest are generally the ones which are growing the fastest. For them, relocating the displaced worker creates only minor problems and the employees need little selling.

Perhaps that's your best sales tool—automate faster!

Then you'll be in a better position to . . .

Sell the Benefits of Automation

- **Easier work—physically, perhaps mentally.**
- **More interesting work.**
- **More job satisfaction through greater responsibility.**
- **Pleasanter surroundings.**
- **Higher pay.**
- **Greater job security in terms of company's ability to compete.**
- **Greater continuity of employment.**
- **A safer job.**
- **Pride of running a new machine.**
- **Opportunity to learn more of total process.**
- **Experience that may be even more valuable as time goes by.**

Switch Control:

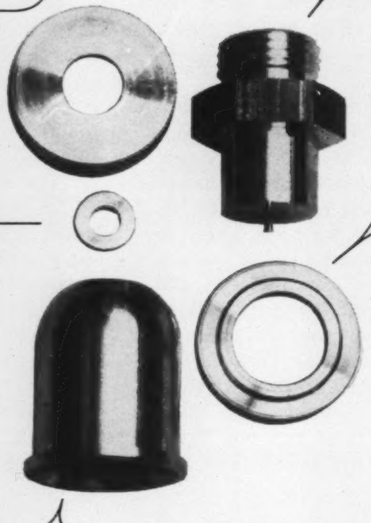
Another Olin alloy change saved the manufacturer about 7% on metal and resulted in higher machine operating speed.

Aircraft Fitting:

Superior surface finish of Olin hexagonal bar eliminated need for secondary finishing operation.

Clock Time Wheel Hub:

An Olin-recommended alloy change resulted in a raw material cost saving of 11%.



Fuel Valve Body:

Olin rod and Olin technical help reduced machining time from 5.5 to 2.4 seconds.

Electronic Part:

The high quality of Olin Aluminum improved the surface finish 25%. Reduced machine down time.

We speak your language: savings!

These endorsements from various manufacturers are typical of the results achieved through Olin's technical assistance—and the use of Olin Aluminum Rod and Bar. Olin *cold processed* Aluminum Rod and Bar is ideal for screw machine products because of its uniform structure and fine surface finish. Olin's Distributor network, coast to coast, carries a full range of this stock in a variety of sizes and alloys. These same Distributors, or your nearest Olin Aluminum Sales Office, will arrange for Olin's technical and marketing service if you'd like some help. Look in The Yellow Pages.

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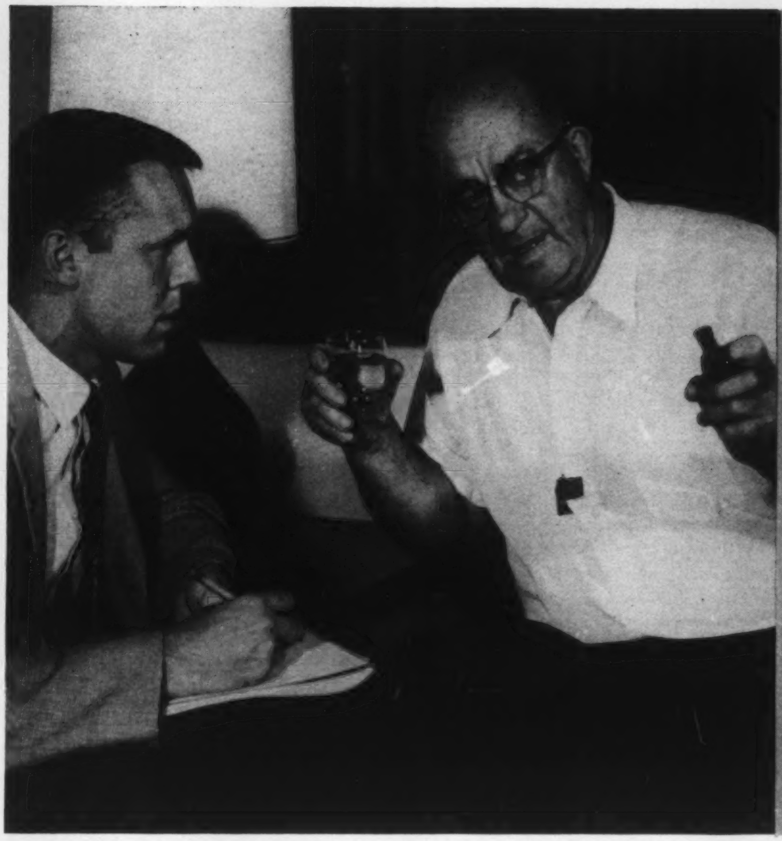
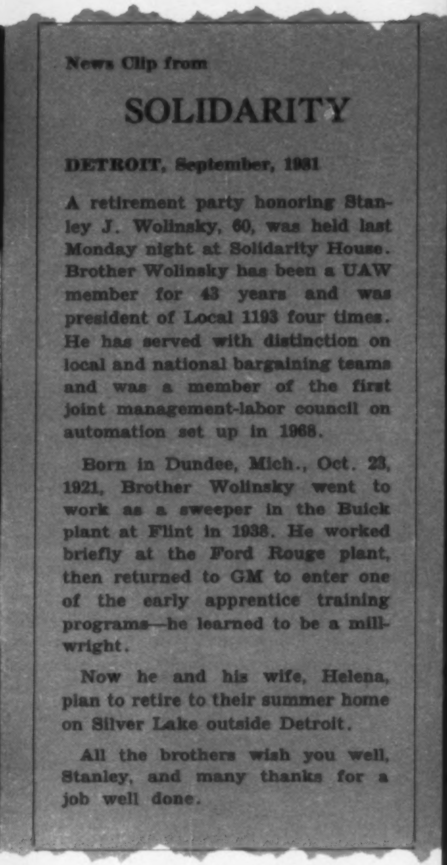




News Clip from

SOLIDARITY

DETROIT, September, 1981

A retirement party honoring Stanley J. Wolinsky, 60, was held last Monday night at Solidarity House. Brother Wolinsky has been a UAW member for 43 years and was president of Local 1193 four times. He has served with distinction on local and national bargaining teams and was a member of the first joint management-labor council on automation set up in 1968.

Born in Dundee, Mich., Oct. 23, 1921, Brother Wolinsky went to work as a sweeper in the Buick plant at Flint in 1938. He worked briefly at the Ford Rouge plant, then returned to GM to enter one of the early apprentice training programs—he learned to be a millwright.

Now he and his wife, Helena, plan to retire to their summer home on Silver Lake outside Detroit.

All the brothers wish you well, Stanley, and many thanks for a job well done.

Stanley Wolinsky Looks at Automation

"YOU ASKED about automation," said Stanley Wolinsky that fall afternoon in 1981 when STEEL queried him about the changes mechanization had brought to the auto industry since he first started working.

"It makes me laugh to see management still griping about automation. Ever since that fellow Harder coined the word, there has been all this hullabaloo. For years, they kept telling us about how much it cost, about how tough it was to debug, and about how it made the whole operation inflexible.

"Well, I notice that Volkswagen in Germany and Renault in France are doing plenty and seem to be able to solve those problems. I tell you that if management in this country doesn't do more of it, we'll be losing markets to those characters. That could mean fewer jobs in the U. S.

"I see in the paper that one of our companies may have to postpone a $30 million automation installation because they can't get 'reasonable' financing. Hell, from what I've seen automation do to cut prices and boost sales, the banks would have to charge 10 per cent a year not to make it pay off. And you and I know that the big boys like GM and Ford don't have to fork over anything like that."

Stanley Wolinsky was warming to his argument now, and went to get a union pamphlet.

"Look, all the facts are in here. Solidarity House has got the facts and statistics to show what mechanization can do. You may have forgotten this, but I haven't. Twenty years ago, unemployment was nearly 8 per cent of the total work force! Automation helped cut that to only 3 per cent by 1965! How? By lowering costs. That stimulated demand and employment to meet the demand.

"I don't have to tell you about gains in employment and wages since the 1960s. I attribute them almost entirely to automation. It's no accident that the UAW membership started turning around then . . . after quite a few years of decline when automation was just getting started and the full benefits hadn't been realized."

Mr. Wolinsky hitched forward in his chair.

"We—the union and the workers—bore the brunt of those transition troubles—took the layoffs and short hours—while the bosses took their good sweet time about modernizing the plants.

"Now I see signs that we're going through this whole hassle again," said Mr. Wolinsky, pointing to the clipping about the possible delay in the $30 million project.

"Another thing that gets me," he continued, "is this so-called problem about job retraining. Hell, I retrained twice in the last 20 years—in 1962 and again in 1974. I got a better job both times, with better pay.

"Just because some nuts in that crazy upstate local bellyache about retraining, management gets all upset. Why the fellows in Solidarity House haven't been listening to those guys for five years that I know of. Why should management?

"If a guy's too dumb to retrain, you know the company-union employment service can find him something, especially in these times. Anyhow, those fellows knew two years ago that they were going to get automated. Did they apply for retraining? No. Have they lifted a finger to learn from the Employment Opportunity Listing what other jobs are available? I doubt it."

Mr. Wolinsky sighed. "Management isn't doing enough planning on this retraining thing. Remember that case four or five months ago? The new line was 90 days behind schedule because they couldn't find enough people to handle the computers. Somebody goofed on training in the front office. I can cite other cases, and the union has raised the roof on them all.

"And then the guff we get about debugging! Sure, this new stuff is complicated, but I know a case where it took six months. Something's wrong with that.

"Something's wrong with all the talk about inflexibility, too." Stanley Wolinsky almost upset his glass. "The fancy new machines will handle so many parts interchangeably that now we can phase from one run to another in no time at all. We've had three 10 million car years in the last decade, with another one coming up, so I don't see any tough problem in keeping the machinery busy."

The retiree gestured with the UAW pamphlet. "Look, we can't afford to lose that time. We can't afford to lose a $30 million automation installation.

"Automation, mechanization, technological change —call it whatever you want—has had a terrific effect. This pamphlet really gives you chapter and verse. Take 1860 to 1960. In that 100 years, technology helped to boost jobs from 10.5 million to 66.7 million, to cut the hours a man needs to work in his life from 180,500 to 90,000, to increase real wages five times, and to cut real prices by one-third.

"Young man," said Mr. Wolinsky, tapping his chair, "we need more automation, faster. If management won't do it any faster, I predict the union will get the government to step in and do it for them."

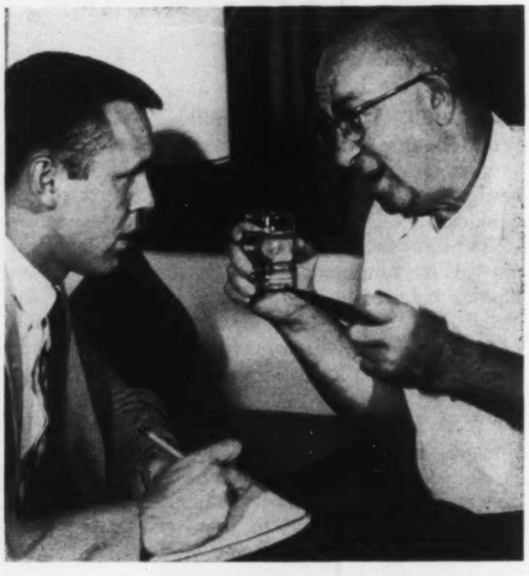
• *Bound reprints of the study on Automation and Jobs are available at $2 a copy; prices for larger quantities on request. Write Reprint Dept.,* STEEL, *Penton Bldg., Cleveland 13, Ohio*

'If management won't

automate any faster,

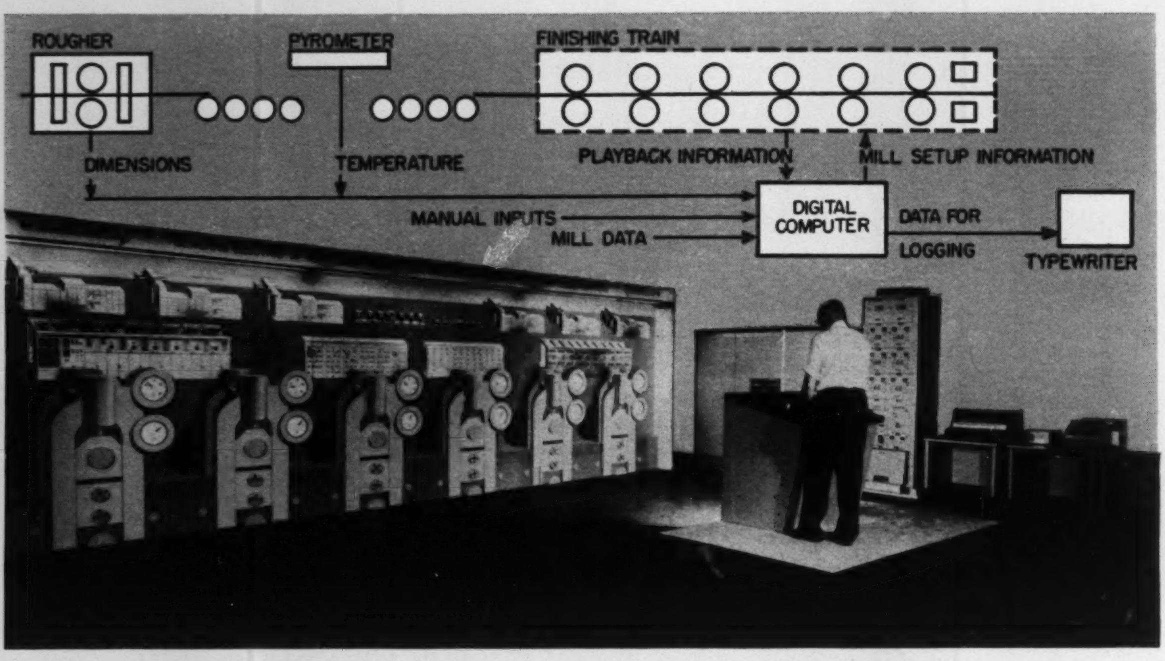
. . . the government

will do it for them'



How To Engineer A Better Product Finish...FOR TOMORROW

Where product or component finishes involve critical limits—in areas of tolerance, unit-cost or rate of production—abrasive engineering discussions often continue late into the night. And, whether the subject be planning for a new product or a cost-reduction problem on current production—*the man to sit in with you is your Carborundum field engineer.* He brings to your office a tremendous accumulation of practically tested abrasive knowledge and experience. Trained in all major abrasive methods employing either belts, discs, wheels, abrasive grains and powders—he recommends impartially. For maximum efficiency with abrasives, this help is always available from your Carborundum district office. A phone call will do. **CARBORUNDUM**



U. S. automation engineer tells British Iron & Steel Institute . . .

Computers May Control All Future Strip Mills

• IN THE FUTURE, "all tandem hot strip finishing mills in the U. S. are likely to be controlled by on-line computers." That statement was made at the annual general meeting of the Iron & Steel Institute, London, England, by H. S. Maxwell, metal rolling application engineering, General Electric Co., Schenectady, N. Y.

"We expect a single process control computer to encompass slab reheat, rolling, cooling, and coiling in the near future," says Mr. Maxwell. "But equipment now going into service is concerned primarily with the finishing mill. A six stand finishing train is being put under computer control this summer. The computer is installed and undergoing field tests prior to closed loop operation."

• Savings in production costs are promised by faster, more accurate mill adjustments.

Most important reason for potential monetary return: Mills of the latest mechanical and electrical design can produce strip within a mil or two of target thickness 2 or 3 seconds after the head end is through the finishing stands, without regard for variations in rolling schedules. Example: One mill, under field test, held gage variations to plus or minus 0.001 in. (except at extreme ends) on slabs rolled direct from the mill (without reheating). Rolling time for a typical slab was 80 seconds, with a temperature rundown of about 150° F.

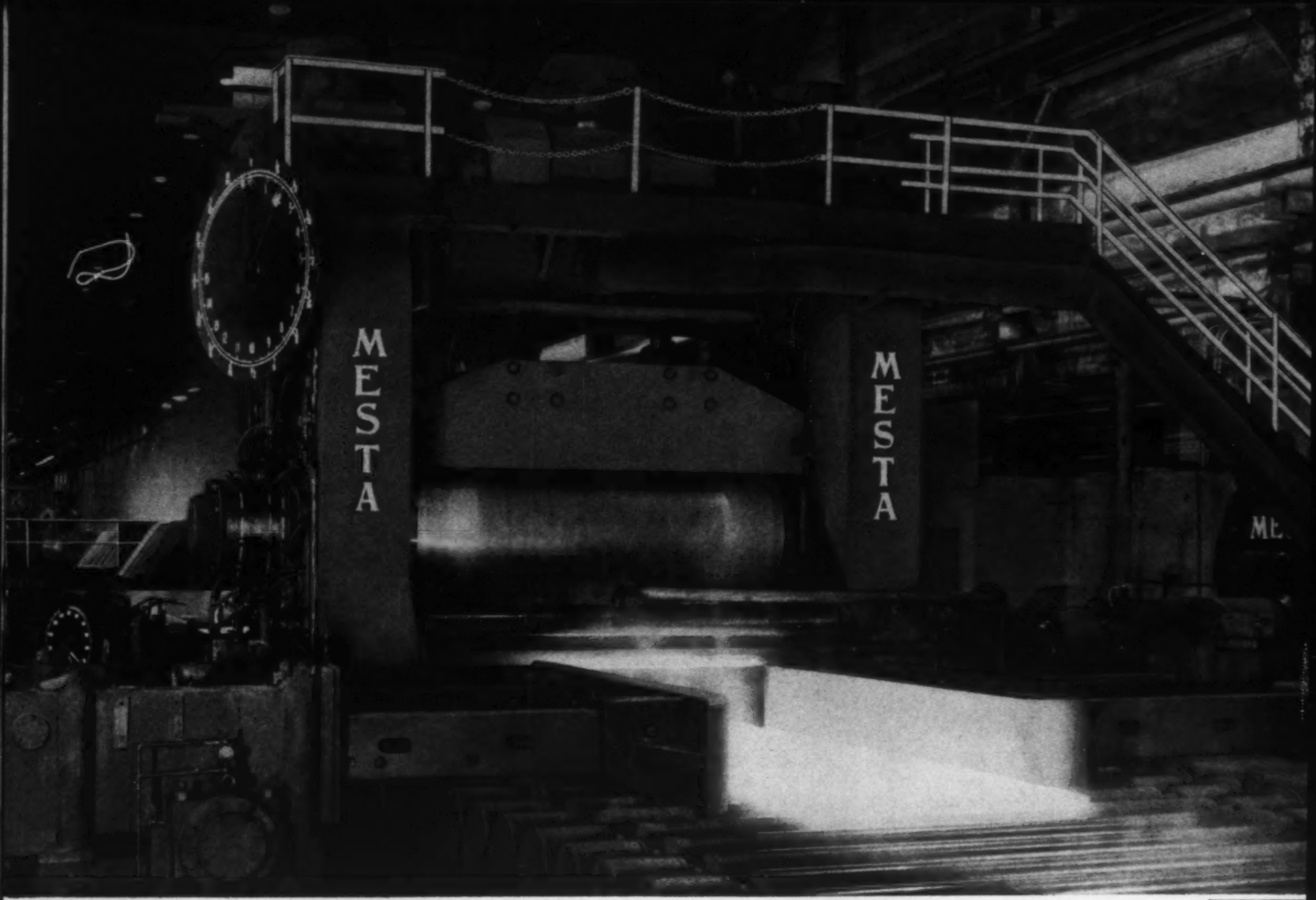
Gagemeter systems are used on stands No. 2, 3, 4, and 5. Strip tension is held as low as possible without interfering with tracking, by operating with partially raised loopers.

Other factors, such as higher tonnages, closer temperature control, automatic mill monitoring, and production record keeping, strengthen the potential of computers in strip mill operation, says Mr. Maxwell.

• Mill setup is expedited by combining manual computer inputs with readout from sensors on the mill stands.

The operator applies appropriate manual inputs to the computer—roll diameters, steel grade, last stand draft, and the desired output gage, speed, and load division among the stands. That information is fed into decade switches on the control console and gated into the computer memory.

Width and thickness measurements are read by plastic potentiometers that measure roll positions during the last pass in the reversing rougher. Mill setup calculations (based on the assumed finishing mill entry temperature for the grade being rolled) are made and sent to buffers. As the tail end of the pre-

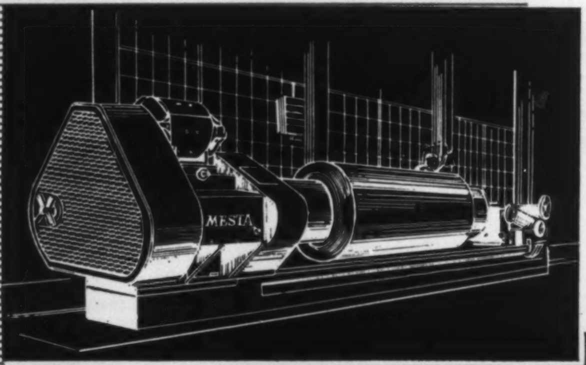


MESTA 148" Four-High Reversing Plate Mill
at Fontana Works of Kaiser Steel Corporation.

PLATE MILLS

designed and built by

MESTA



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ceding strip leaves each stand, the screwdowns, mill speed, Gagemeter reference, and side guides are adjusted to accommodate the incoming bar.

A two color pyrometer measures head end temperature as the bar approaches the crop shear. If assumed and actual temperatures aren't the same, the computer recalculates the setup, and the mill is re-adjusted.

Mill setup can also be improved as the bar enters the first stands. If measured roll force is too far from the calculated value, roll openings in subsequent stands are given a vernier adjustment.

- **Appropriate reduction-power relationships are drawn from the computer memory system.**

The computer calculates power values for the various stands, allowing for the effects of speed and temperature and making the appropriate load division. Those values determine drafts at all stands but the last. The drafts, with allowance for slip, establish roll speeds.

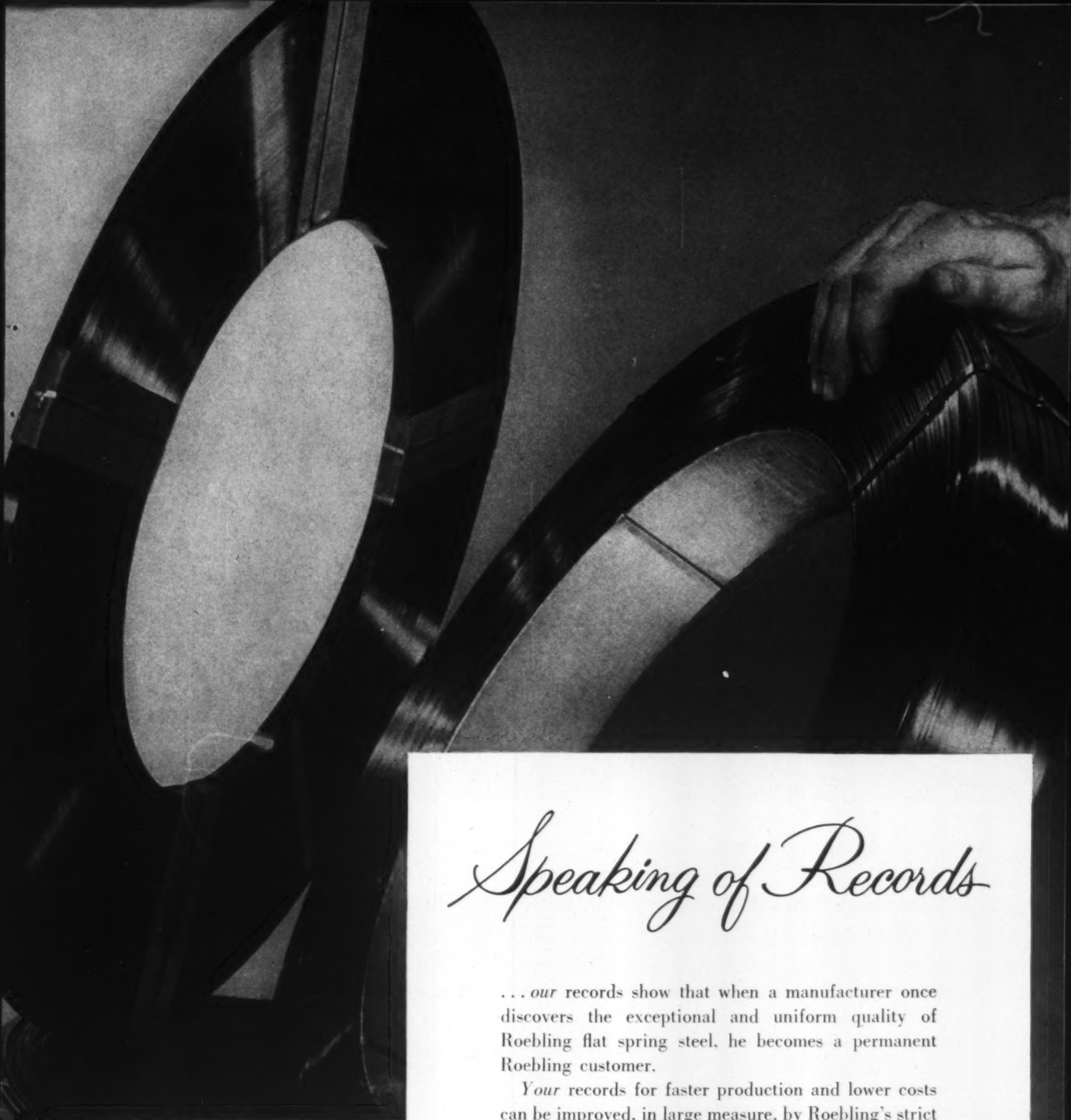
Checks are made to determine whether the stands will be operating within their speed range and overload capacities. If not, the computer tends to equalize loads, and changes delivery speed, within limits.

If impossible conditions exist as the slab approaches the first finishing stand, the computer stops the roller tables and signals for an operator decision. (That decision might be to roll heavy gage strip under manual control.)

- **Computers follow a self-check, diagnostic routine, or log production data, when they aren't making mill setup calculations.**

When the mill is running and the computer isn't busy with mill setup calculations for the next slab, it logs production data. Examples: Tallies of footage, classified by width and gage deviation, and calculation of coil weights and yield percentages.

Mill data, such as temperature, interstand thicknesses, and roll separating forces, can be logged for further process analysis. The computer can also be used for periodic measurement of mill modulus on the stands and to help determine reduction-power relationships for various grades of steel. Such information is helpful when the mill is under manual control.



Speaking of Records

. . . *our* records show that when a manufacturer once discovers the exceptional and uniform quality of Roebling flat spring steel, he becomes a permanent Roebling customer.

Your records for faster production and lower costs can be improved, in large measure, by Roebling's strict attention to supplying you with the finest flat spring steel available. When you need flat spring steel, specify Roebling. Write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey, for complete details.

These are typical of the many types of quality parts produced from Roebling flat spring steel.

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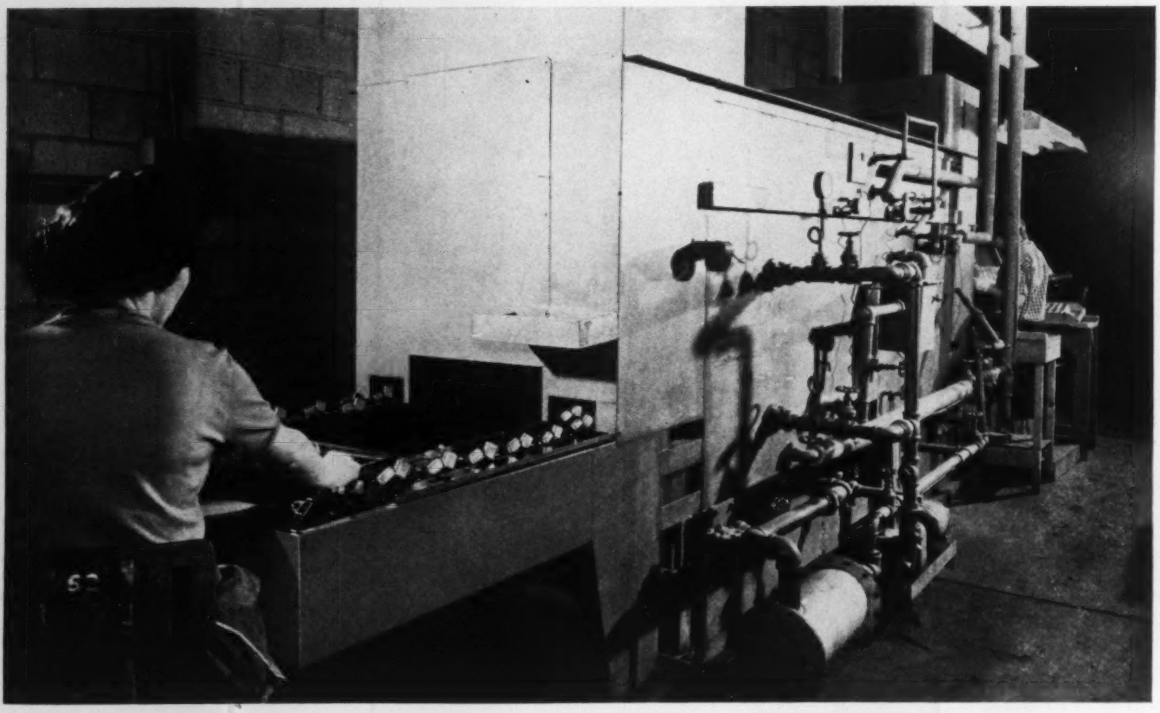
Roebling... Your Product is Better for it



HOW ZIPPO DEGREASES 100,000 PARTS BEFORE CLEANOUT

Zippo Manufacturing Company, Bradford, Pa., is meticulous about degreasing parts and cases used in their lighters. The company does as careful a cleaning job as watchmakers or manufacturers of aircraft instruments.

With all their attention to detail, they still manage to degrease 100,000 parts before cleanout with Nialk® TRICHLORETHYLENE. The special stabilizer contains *psp*—permanent staying power. This permits them to process a large volume of parts without endangering their quality. *Psp* maintains the stabilizer at maximum efficiency between cleanouts.

The stabilizer also prevents gummy substances from forming, substances which might coat the heating elements in the degreaser units and reduce efficiency of the operation. The vapor and bath stay clean. Parts never become tarnished.

When baths are cleaned out, Zippo gets full recovery of the solvent, and it is fully stabilized so they never have the cost and trouble of adding fresh stabilizer to maintain bath strength.

Zippo likes the several different degreasing jobs that Nialk TRICHLOR does. As many as five different metals might be degreased in a day—brass, stainless steel, die-cast zinc, copper and gold.

Even considering all the use Zippo gets from each bath, they have never had to sacrifice quality. There has never been a need to titrate or run any other type of test.

Nialk TRICHLOR can bring you the same benefits and cost savings. Hooker technical experts can help you to set up your degreasing operations, then check regularly to make sure your operation remains trouble-free. Zippo obtains Nialk TRICHLOR through Ken C. Merrill Co.

See *your* Hooker Chemical distributor. He will be glad to help you with your problems and questions. Or write us direct. Our years of experience are yours for the asking.

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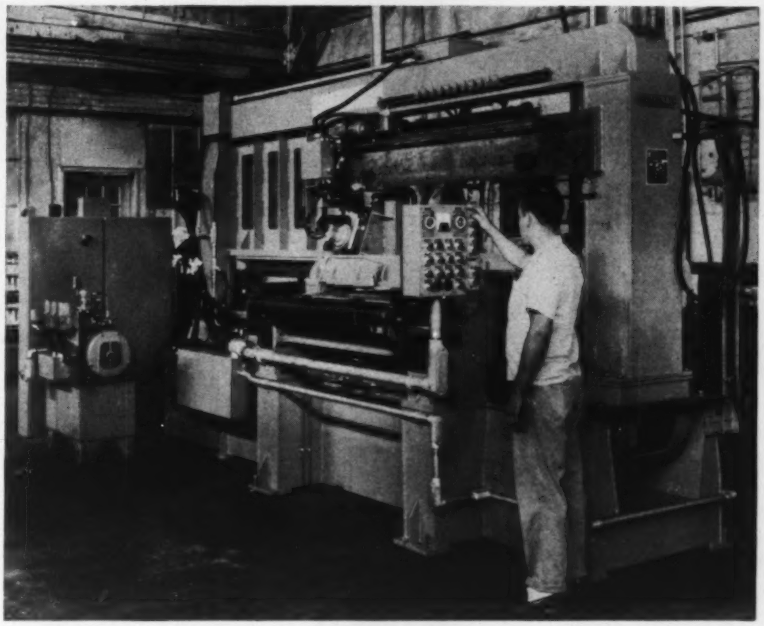
Coil Joiner Buttwelds Galvanized Steel Strips



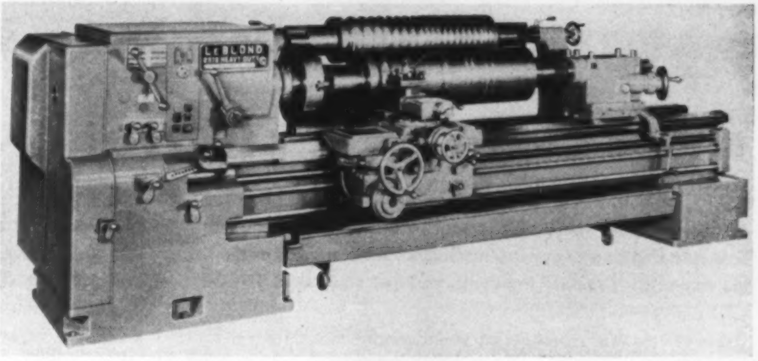
GALVANIZED strips are buttwelded by the CO_2 arc method on this automatic coil joiner. Compact control grouping simplifies one man operation.

The machine also shears strip ends and grinds weld buildup for a flat, burrfree joint in an automatic sequence. The unit can weld strips of 14 to 28 gage galvanized stock in widths up to 48 in. The company says the unit can be used for other coil joining work where a continuous, high strength joint is desired on noncoated stock.

Welding torch and high speed grinder are mounted together on a track at one end of the O-frame. Torch and grinder travel is independently controlled.

For further information, *write* National Electric Welding Machines Co., 1846 Trumbull Ave., Bay City, Mich.

Precision Lathes Also Do Heavy Duty Work



RUGGED jobs can be handled by lathe sizes 2516 and 3220 made by LeBlond. Bed width on the 2516 is 22¾ in. with a 25 in. swing over the bed and a 16 in. swing over the cross slide. The 3220 has a 24½ in. bed.

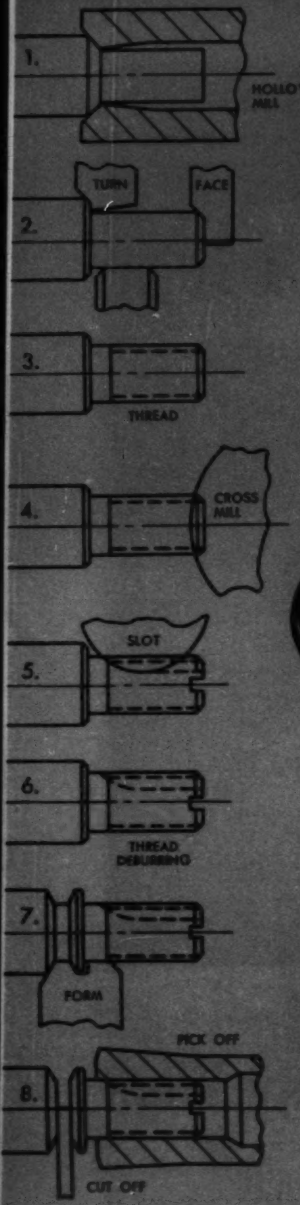
The company says high rigidity and power make the lathes suitable for hogging cuts and smooth finishing. They can be used for turning heavy forgings and delicate toolroomwork on precision missile components. Fitted with LeBlond's 90 degree tracer, they can turn bar mill and similar steel mill forming rolls.

Both units have 36 spindle speeds in three ranges from 10 to 1300 rpm. They offer 60 feed and thread changes with standard feeds ranging from 0.0045 to 0.269 in. Both are rated for 40 hp motors.

Spindle speeds are selected through an all spur gear drive. The drive uses LeBlond's no load principle where only the gears and shafts transmitting power are in motion. Low power loss and maximum efficiency result. Bed ways, hardened and ground, are replaceable.

Both lathes can be ordered as toolroom models. The 2516 NF is built in a plain bed, gap model (the swing is increased about 50 per cent through the gap).

For further information, *write*



One handling of this Threaded Stud (1112 steel) on a 1" 8 Sp. Bar Conomatic *includes* cross milling, slotting, thread deburring, picking off and back facing (all operations without stopping the work spindles).

Those cost-saving EIGHTS!

With more work spindles and tooling positions for including — in one chucking — operations that would otherwise require the expense of second handling, you just can't *beat* THOSE COST-SAVING EIGHTS.

Likewise, as replacements of four spindle machines — on more simple work — with double stock feed and double setup, producing two pieces per cycle, nothing *compares* with THOSE COST-SAVING EIGHTS.

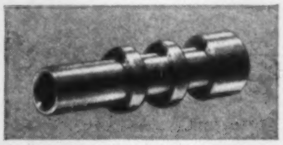
For ever-increasing work requirements — in less floor space, with less power, less coolant, less lubricant and maintenance, and less transfer and paper work — many "automatic" users are finding THOSE COST-SAVING EIGHTS more *profitable*. How about *you*?

Write, wire, or phone *today* for particulars. There is no obligation. Cone Automatic Machine Company, Inc., P.O. Box 27, Windsor, Vermont.

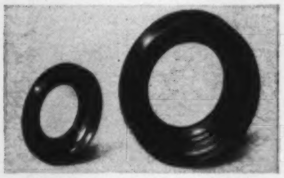
Conomatic

World's Most Productive Line of Automatic Lathes

Consistent, *dependable* handling of one or more of the following operations in a single setup has earned the CONOMATIC an enviable reputation as the *leader* of THOSE COST-SAVING EIGHTS: cross drilling and milling, end milling, broaching, spinning, stamping, OD and ID burnishing, eccentric drilling, turning and boring, eccentric forming, multiple hole drilling and tapping, oil groove rolling, back facing, back slotting, back hole drilling and counterboring, induction hardening and quenching.



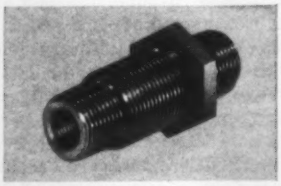
One handling of this Valve Bushing (8620 steel) by a 1" 8 Sp. Bar Conomatic ***includes*** cross drilling of 4 holes and back counterboring of large hole.



One handling of these bearing cups by a 3" 8 Spindle Bar Conomatic ***includes*** burnishing, induction hardening and quenching of the ball race.

One handling of this Ball Joint Housing (1012 steel) by a 2⅝" 8 Sp. Bar Conomatic ***includes*** burnishing inner ball race.

One handling of this Sleeve (B-1112 steel) on a 1⅝" 8 Sp. Bar Conomatic ***includes*** offset milling.



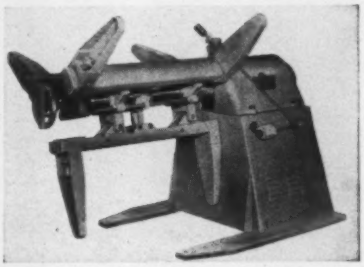
One handling of this SAE 1113 stud by a 1⅝" 8 Sp. Bar Conomatic ***includes*** rolling one OD pipe thread and cutting the other. Also ***includes*** cutting OD straight thread and ID pipe thread.

R. K. LeBlond Machine Tool Co., 1947 Edwards Rd., Cincinnati, Ohio.

Heavy Duty Stock Reel Holds 5000 lb Coils

WITH THE Cooper Weymouth, heavy duty spindle reel, you can handle coils weighing up to 5000 lb. Plain and motorized models are available. All models have three support arms with quick adjustment keepers. The parallel rule arms are easily adjustable from the front for different inside coil diameters. Automatic centering is a reel feature.

The units are made for three stock widths: 18, 24, and 36 in. Standard units can accommodate coils having 14 to 18 in. inside diameters. Others can be supplied. Motorized models have a spindle speed of 12.8 rpm.

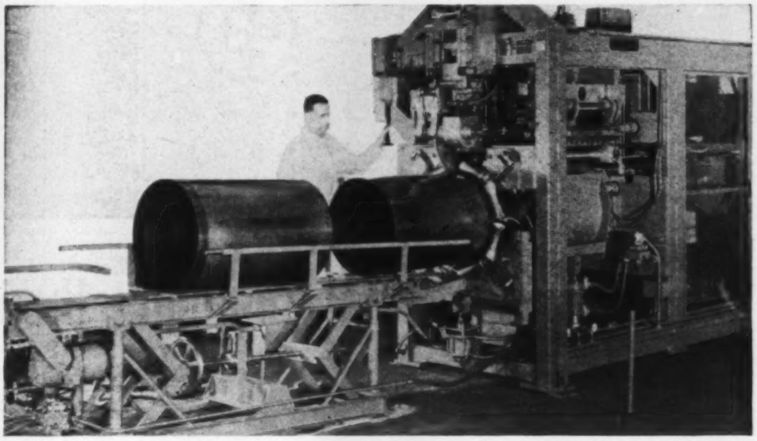


For further information, *write* Cooper Weymouth Inc., Stratford, Conn.

Industrial Batch Ovens Provide Heat to 600° F

JOBS such as general aging, curing, drying, preheating, tempering, coil

(*Please turn to Page* 104)

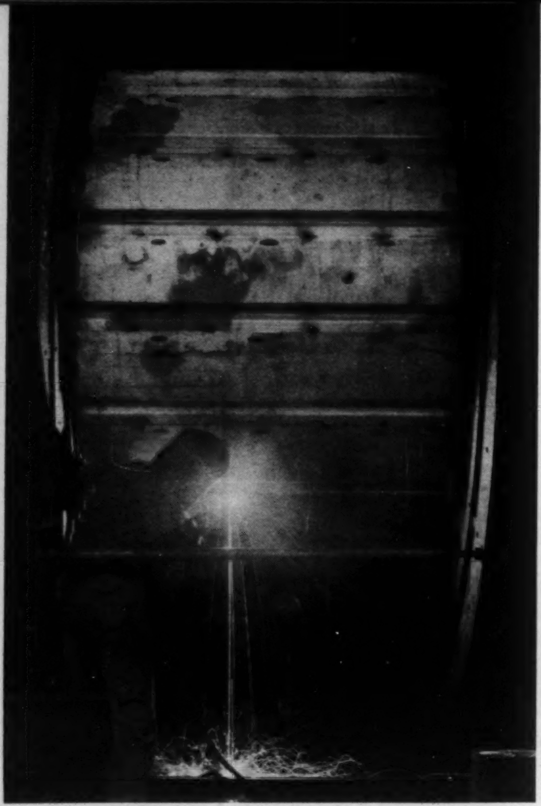


Drums Made at Rate of 700 an Hour

THIS MACHINE forms flat sheet steel stock into cylinders and automatically positions the cylinders into a seamwelding station. The manufacturer says it can be used with automatic sheet feeding units as an integral, automatic line or the sheets can be fed manually.

The machine can handle a cylinder diameter from 13½ to 24 in., a cylinder length from 14 to 40 in., steel sheet thickness from 22 to 16 gage, and a weld speed range from 20 to 60 fpm. Peak production is 700 drums (55 gallons capacity) an hour, 600 an hour on an average shift. The machine illustrated is intended for three phase operation and is arranged for lefthand feeding (facing the front of the machine). Units for single phase operation—either righthand or lefthand feeding—are available.

For further information, *write* Federal Warco Div., McKay Machine Co., Warren, Ohio.



A welder simply tackwelds a Stainless Steel plate on a Komline-Sanderson "Coilfilter" drum. Stainless is specified because of its great strength, corrosion resistance and ease of fabrication.

Order Stainless Steel from your nearest Steel Service Center.

At Morrison Steel Company, they cut Stainless Steel

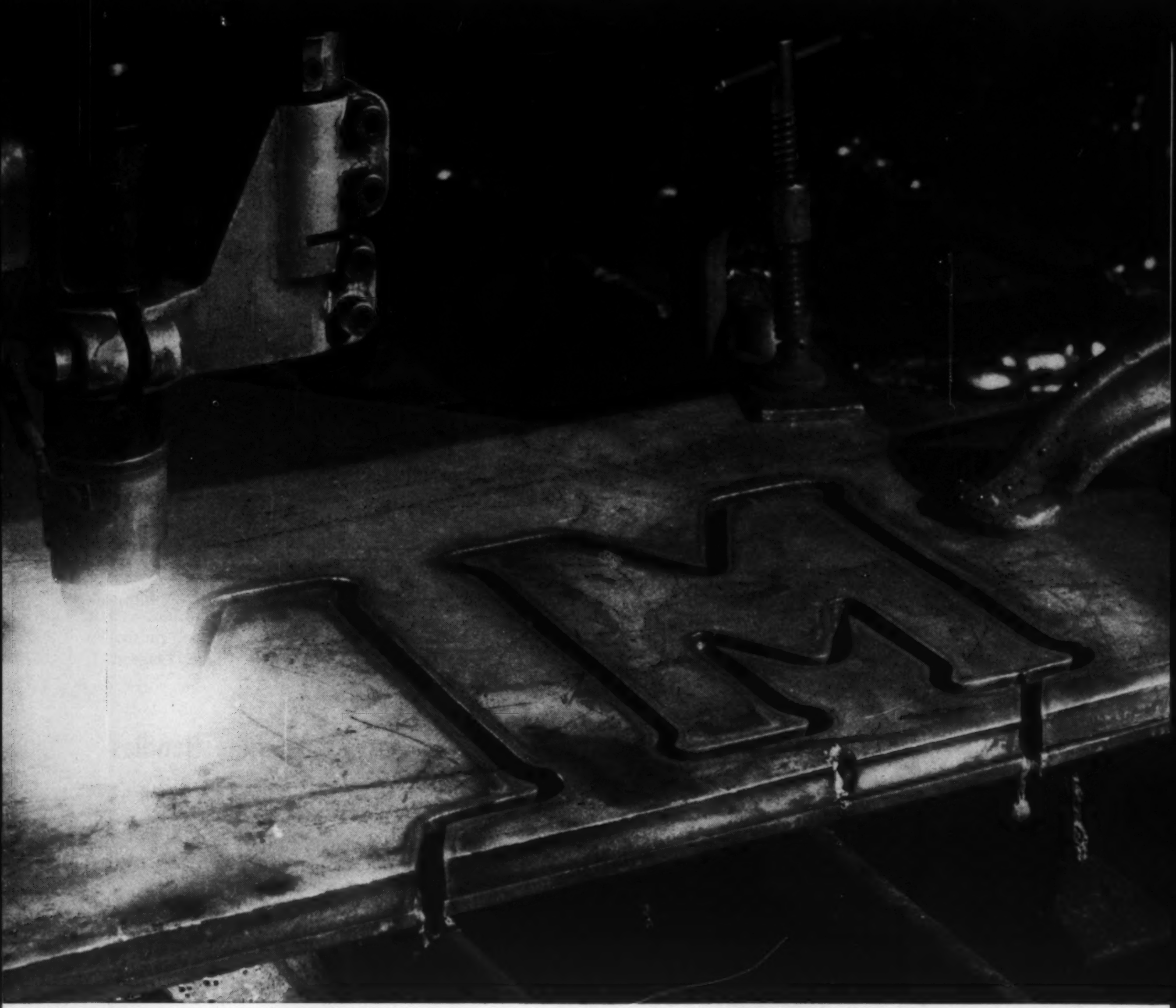
Morrison Steel Company, New Brunswick, New Jersey, is one of the leading carbon steel and Stainless Steel service centers in the East. It has been and continues to be headquarters for some important research aimed at developing new and efficient cutting processes for the Stainless Steel they sell. Morrison was the *first* service center to adopt the Linde Company's "Plasmarc" cutting process (formerly called "Heliarc") for cutting Stainless Steel. Morrison's customers have reaped the benefits of this extensive program, in terms of quality steel, faster deliveries and reduced manufacturing costs.

For considerable time—Morrison engineers worked with Linde Company, Division of Union Carbide Corporation, to find an efficient way to cut Stainless Steel plates. The result was Morrison Arc-Cut "Plasmarc" cutting of Stainless plates into rings, discs and contour shapes to exact tolerances. It could originally cut plates up to an inch thick, but has been further developed to cut Stainless up to four inches. Cutting Stainless Steel this way prevents carbide precipitation, does not distort or discolor the metal, and does not change machinability or magnetic permeability in the immediate adjacent area. Stainless parts can be used directly after arc cutting without pre-use preparation. Customers, in fact, order their parts directly from Morrison and save themselves an expensive fabrication step.

In brief, the basic function at Morrison remains the same: "Take a material from the shelf and put it on a machine." They are prepared to meet change. They employ men who work with blueprints; they have a formalized program for selling, service, merchandising and marketing. They employ 21 salesmen on the road and 15 men handle the phones. Morrison maintains its own fleet of trucks and garages. All of this means better service to their customer.

Operating in a modern 200,000-square-foot plant, Morrison Steel is considered a model steel service center. Morrison is a one-stop source with trucks that deliver daily to all points in New Jersey, eastern New York, eastern Pennsylvania and Delaware.

One customer who benefits from Morrison's cutting service is Komline-Sanderson Engineering Corporation of Peapack, New Jersey. Komline-Sanderson makes rotary vacuum filters. Their markets include industrial plants, municipalities, chemical plants and process industries, and their filters handle food, chemicals and drugs, among others. They use Stainless Steel in their filters because Stainless Steel's superior corrosion resistance prevents product contamination. Morri-



Morrison's gas-shielded arc cutter turns out intricate Stainless Steel shapes in one quick, smooth operation. The "Plasmarc" cut seldom needs post-machining or annealing and finished parts can be supplied direct from the warehouse using this cutting system.

plates letter perfect

son furnishes Komline-Sanderson with Stainless Steel plates that are all ready for finished assembly because their arc-cutting operation can cut to extremely close tolerances and eliminate Komline-Sanderson's need for any further work on the plates before the filters are put together. Thus, a Stainless Steel service center becomes an actual parts supplier for a customer. Komline-Sanderson doesn't have to carry a big, expensive Stainless Steel inventory—Morrison does it for them—and they know they can count on prompt delivery from the warehouse.

Morrison's research doesn't end with an arc-cutting process. Recently, they installed, after extensive testing, several ultramodern electronic high-speed band saws that can also cut Stainless Steel to extremely close tolerances.

Morrison specializes in delivering Stainless Steel in large or small quantities to a vast number of customers. Often it is cut to exact order, ready for fabrication. Manufacturers depend on Stainless itself for superior corrosion resistance, excellent heat properties, good appearance and ease of fabrication. When you need Stainless Steel, get it from your Stainless Steel service center. USS is a registered trademark.

Morrison Arc-Cut is a registered trademark of the Morrison Steel Company. Plasmarc is a registered trademark of Union Carbide Corporation.

Operator at Morrison Steel checks "Plasmarc" setting.

USS United States Steel

LET MUELLER MAKE IT!

Mueller Brass Co. of Port Huron is much more diversified than the name "Brass" implies . . . a lot more. In fact, because of its many and varied facilities . . . its *men, methods* and *metals* . . . Mueller is in the unique position of being able to offer true single source service.

MUELLER HAS THE MEN . . . experienced engineers with the ability to work out, creatively, tough design problems, and improve a part or components for production by the most economical method. You get sound engineering plus 44 years of practical metalworking production experience when you "Let Mueller Make It."

MUELLER HAS THE METHODS . . . when you "Let Mueller Make It", you are utilizing one single source that is able to produce parts any one of these ways: as forgings, impact extrusions, sintered metal parts, screw machine products, formed tube or as castings.

MUELLER HAS THE METALS . . . and the materials . . . to produce precision parts in aluminum, brass, bronze, copper, iron, and steel in hundreds of different alloys to meet each exact requirement.

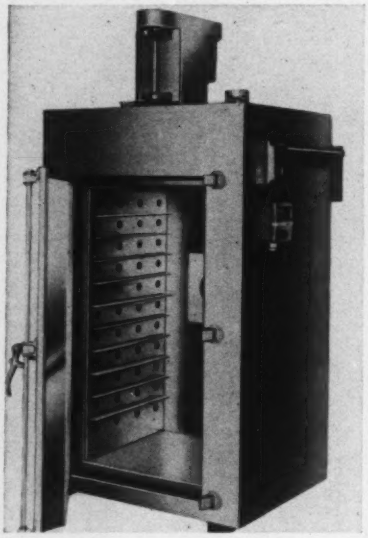
In addition, Mueller Brass Co. has complete and modern facilities for performing all types of finishing and sub-assembly operations. Another plus value is nation-wide sales engineering service.

So, in the final analysis, no matter where you fit in the American industrial picture, whether you're making missiles or mowers...and no matter where you're located, it will pay you to LET MUELLER MAKE IT!

MUELLER BRASS CO.
PORT HURON 26, MICHIGAN

(Concluded from Page 101)

and armature baking, core baking, and synthetic finish baking can be done in industrial batch ovens developed by Blue M. Six standard sizes are offered (16 to 96 cu ft).

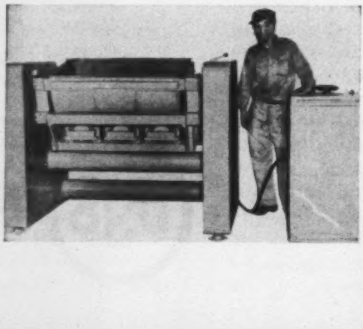


The units are mechanical convection, horizontal airflow types. Each has an indicating-controlling Thermoregulator (thermostat). You can get temperature ranges to 356 and 600° F. The thermostat provides quick reading and setting of oven temperatures and is equipped with dual scale calibration, enclosed contacts, and stainless steel sensing bulb and capillary.

For further information, *write* Blue M Electric Co., 138th & Chatham Street, Blue Island, Ill.

Vibratory Finishing Unit Has Only One Moving Part

A VIBRATORY finishing machine (6 cu ft capacity) uses a resonant, electromagnetic system to give shaking forces up to 50 g with only one moving part—the tub.



Typical applications for the finisher (called Vibrodyne V-600) include deburring, radius forming, descaling, flash removal, cleaning, and polishing. The manufacturer says the unit's shaking force makes it many times faster than conventional methods and that the tub lining is the only part that wears out. The machine (weighing 2750 lb) does not require bolting to the floor.

Shaking force is set by a single knob (0 to 5/16 in. amplitude) and power is 220 volts (ac) operating through three pair of epoxy impregnated and encapsulated magnets. The air dumped tub is 37 x 20 x 15 in. deep and holds a 750 lb charge.

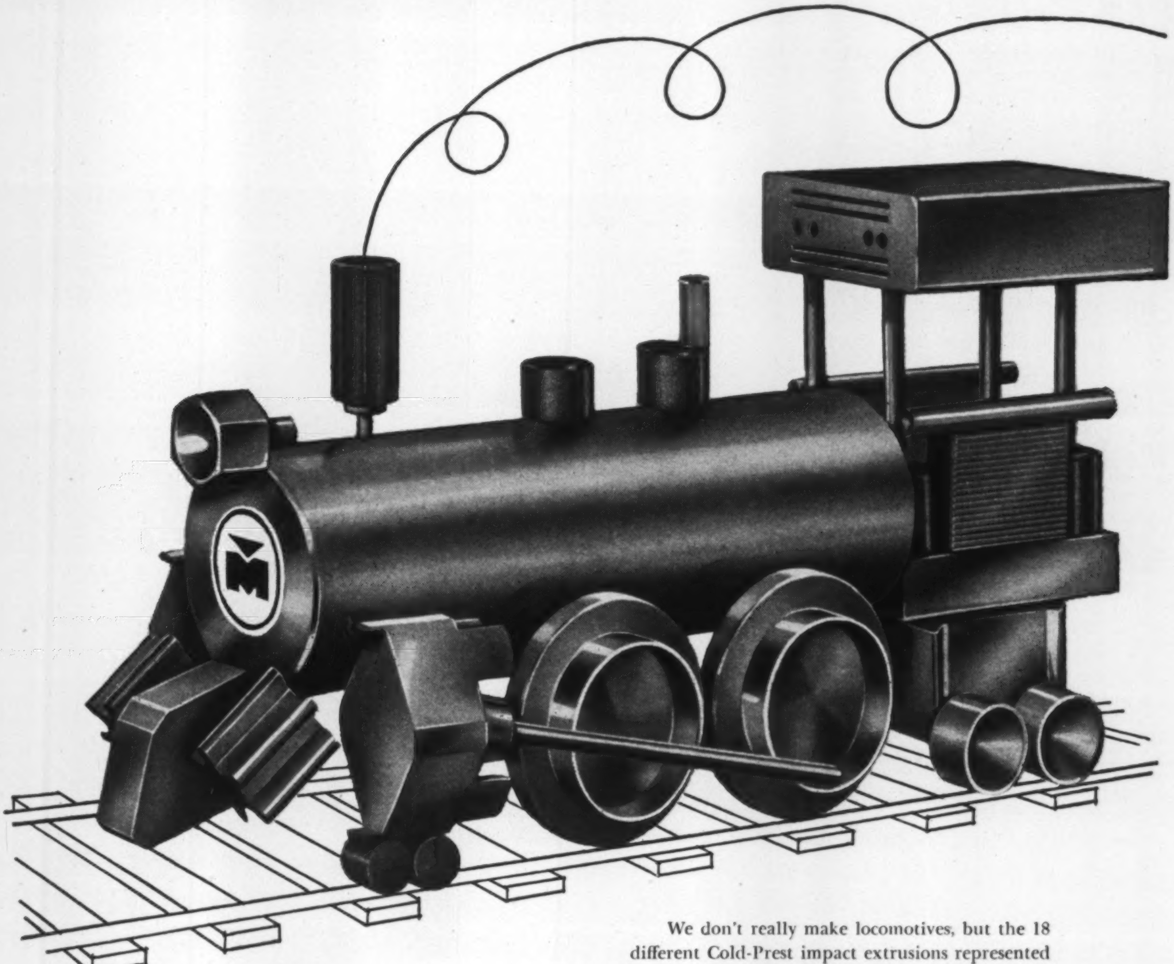
For further information, *write* Vibrodyne Div., Globe Industries Inc., 125 Sunrise Place, Dayton 7, Ohio.

Cutoff Machine Handles Wide Variety of Jobs

A WIDE range of ferrous and nonferrous cutting operations can be handled accurately, quickly, and safely with the M-160 cutoff machine.

It's powered by a 15 hp, continuous duty, geared-in-head motor (induction type). You can get motors for 220 or 440 volt, 60 cycle,

MUELLER CAN MAKE MOST ANYTHING IN IMPACT EXTRUSIONS...



We don't really make locomotives, but the 18 different Cold-Prest impact extrusions represented in the model were cold forged to exacting tolerances from a number of aluminum, copper, brass, and steel alloys.

These parts are employed in products ranging from door closers to missiles. Mueller has also made important advances in the production of copper impact extrusions that are especially adaptable to electronic applications. Cold forgings are precision produced to exacting tolerances and offer the additional advantage of a better finish and appreciable metal savings.

Mueller's flexible facilities for the production of Cold-Prest Impact extrusions make practical long or short runs of simple or relatively complex shapes on an economical basis. In addition, the entire Mueller engineering staff, excellent machining, finishing and assembly facilities are readily available to you when you . . .

LET MUELLER MAKE IT!

MUELLER BRASS CO.
PORT HURON 26, MICHIGAN

Write today for Engineering
Manual No. FM-3019

344

three phase current. A No. 2 magnetic starter is provided with each motor.

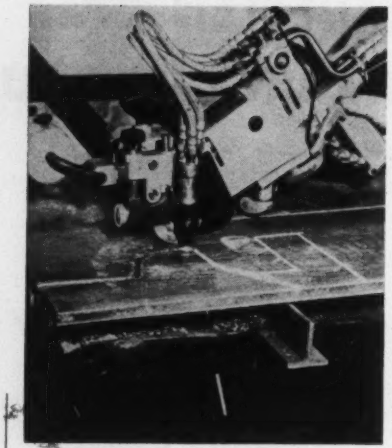
Available in a 20 or 24 in. size, the unit may be equipped for wet or dry cutting as well as manual, semiautomatic, or automatic operation.

For further information, *write* Stone Machinery Co., Manlius, N. Y.

Flame Cutting Device Cuts 2 in. Metal Sections

A 19 LB FLAME cutting machine, the CM-75 Cadet, makes fast, clean cuts in metals up to 2 in. thick. It's equipped with a clutch that makes the unit suitable for hand guided contour cutting (allows instantaneous freewheeling control).

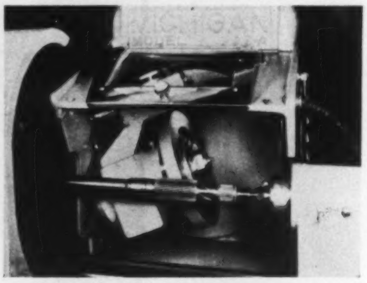
The device operates at speeds up to 30 ipm and can be used with acetylene, propane, or natural gas.



For further information, *write* Linde Co., a division of Union Carbide Corp., 270 Park Ave., New York 17, N. Y.

Abrasive Finishing Method Has Manifold Advantages

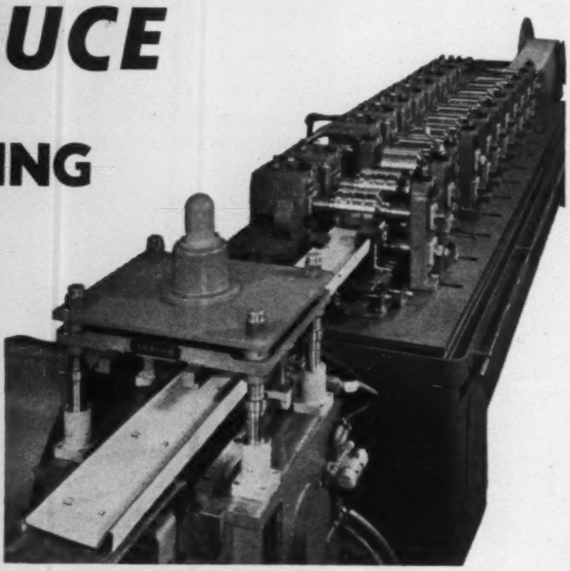
AN APPROACH to abrasive finishing of hardened gears and cylindrical parts uses a four directional relative movement between the workpiece and the abrasive tool. The developer says the process enables better finishing to be done on gears and other parts after hardening.



Nicks and burrs can be removed with ease and some dimensional errors in lead and runout, involute, and others can be corrected in a minimum of finishing time. (The process does not depend solely on relative rotary motion between the tool and the workpiece.) In addition, the process provides smoother and quieter running of parts, such as gears, without the necessity of matching or lapping.

The process is incorporated in a new version of the Michigan abrasive gear finisher and is available as standard on the new 999-A ma-

(*Please turn to Page* 111)



REDUCE FORMING COSTS with

AMERICAN ROLLER DIE CORP ARDCOR

Roll Forming Production Lines

ON PARTS FOR . . .
BASE BOARD HEATING UNITS
STORAGE RACKS
ALUMINUM SIDING
CURTAIN RODS AND MANY OTHER SECTIONS

***American* ROLLER DIE CORP.**
29520 Clayton Avenue Wickliffe, Ohio

AMERICAN ROLLER DIE CORP ARDCOR

Single Roll Forming Machines • Complete Automated Roll Forming Production Lines • Lock Seam and Electric Weld Tube Mills for Ferrous and Non-Ferrous Metals • Cut-Off, Pre-Notch Presses • Slitters • Straightening, Pinch, Leveller Rolls • Pipe Rolls, Tube Rolls, Forming Rolls

Problem: Exhaust hoods that don't exhaust

This plant needs make-up air! If the exhaust hoods in your plant aren't doing their full job, chances are they are being outpulled by other fans. Other exhaust fans set up a vacuum by removing air faster than you replace it. Your plant needs make-up air...a supply of new air to replace exhausted air.

Without sufficient make-up air, exhaust hoods can't do their job properly. Plant air becomes contaminated with fumes, dust, and odors. Workers' health suffers. Absenteeism rises; production lags. Other vacuum problems crop up: hot spots at inside areas, cold drafts along walls.

Solution: install a make-up air system -- fans to bring in outside air, and heaters to temper it. A make-up air system like this cancels out vacuum, gives balanced heat and ventilation.

For technical help on make-up air, see your Consulting Engineer. Or call in Sturtevant application engineers. They're experts in handling air...whether you want to move it, heat, cool or clean it. J-80711

WESTINGHOUSE ELECTRIC CORPORATION
Sturtevant Division, IS-11.
Hyde Park 36, Mass.

Send me your make-up air booklet.

NAME______________________________

TITLE______________________________

COMPANY____________________________

ADDRESS____________________________

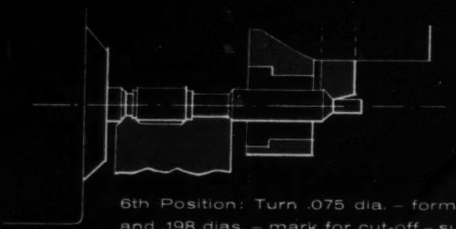
PHONE______________________________

You can be sure...if it's **Westinghouse**

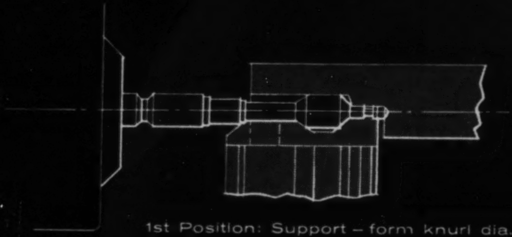
Acme-Gridley Speed & Accuracy...

SLASHES TOTAL MACHINE TIME 76.4%

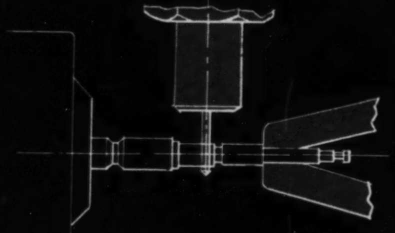
for E.F. Johnson Company



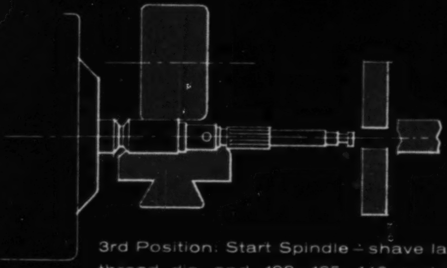
6th Position: Turn .075 dia. – form .165 and .198 dias. – mark for cut-off – support



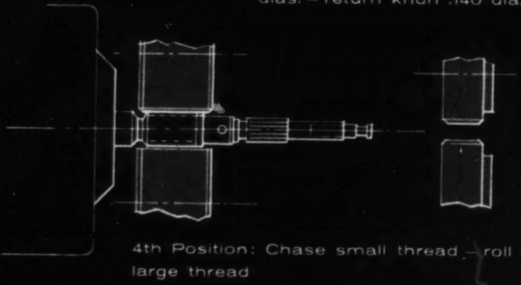
1st Position: Support – form knurl dia., .055 and .075 dias.



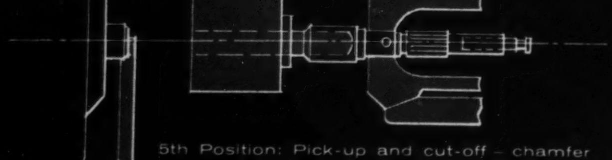
2nd Position: Stop spindle – cross drill – hollow-mill small thread dia.



3rd Position: Start Spindle – shave large thread dia. and .198, .165, .140 and .130 dias. – return knurl .140 dia. face end



4th Position: Chase small thread – roll large thread

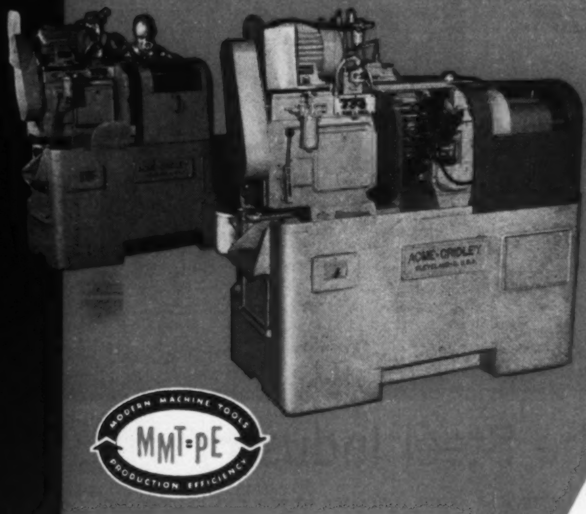


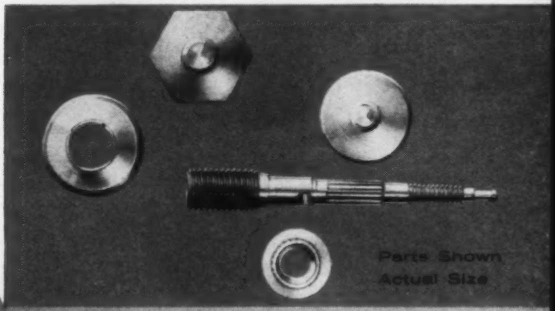
5th Position: Pick-up and cut-off – chamfer front end of next piece – back drill – eject – chamfer front end

Total Machine Time – 5 Seconds

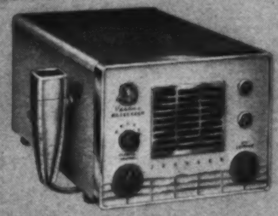
. . . also . . . cost-per-piece is substantially reduced . . . part uniformity and quality definitely improved . . . scrappage all but eliminated.

This is the *record* of two Acme-Gridley $\frac{7}{16}$" RA-6 Spindle Bar Automatics installed at the E. F. Johnson Company, Waseca, Minnesota. Producing some 15 intricate parts, like those shown, the rugged and versatile Acme-Gridleys continually meet the rigid specs of this well-known manufacturer; help make high quality products such as the Viking Messenger Citizen's Band two-way radio available at prices that fit the public's pocketbook.




Parts Shown Actual Size

Viking Messenger Citizen's Band two-way radio



Tangible production savings, like those realized by E. F. Johnson, are assured with Acme-Gridleys. In your plant, the $\frac{7}{16}$" RA-6, or any of the world's most complete line of multiple-spindle automatic bar and chucking machines will show you a new dimension in mass production efficiency.

National Acme

The National Acme Company
189 E. 131st Street
Cleveland 8, Ohio

Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.

NEW
TRW-330
Control
Computer

13-60

Low Cost Computer for the Steel Industry

A sophisticated low-priced control computer with capabilities ranging from simple logging to closed-loop control, the TRW-330 brings you a new standard in flexibility. You can start with a small basic system that matches your current requirements and then add capabilities as you need them.

Thompson Ramo Wooldridge has successfully installed more digital control computers than any other manufacturer. Because TRW-330 design is based on this experience, you are assured that a TRW-330 system offers the greatest value per dollar in computer hardware – in flexibility, reliability, efficiency.

TRW-330 FLEXIBILITY – Memory sizes range from 4,000 to over 100,000 words; analog input capacity from 0 to over 1,000; an optional subsystem permits automatic scanning and alarm functions to proceed independently of the computer's control program. A similar degree of flexibility is afforded by the TRW-330's analog-output system, priority interrupt circuits, digital input-output equipment, fast-access storage, and command structure.

TRW-330's are supplied in cabinets that match the application: rugged cabinets for harsh industrial environment, air purgable cabinets for hazardous environment, or standard control-room cabinets.

TRW-330 CAPABILITIES – TRW-330 computing speeds exceed those of competitively priced machines; addition instructions can be performed in 260 microseconds, including access time.

TRW Computers Company

a division of ***Thompson Ramo Wooldridge Inc.***

TO FIND OUT HOW THE TRW-330 CAN BE APPLIED TO YOUR CONTROL PROBLEM, CONTACT ANY OF THE TRW COMPUTERS COMPANY OFFICES LISTED BELOW.

220 North Canon Drive
BEVERLY HILLS, CALIFORNIA

1510 Esperson Building
HOUSTON, TEXAS

200 East 42nd Street
NEW YORK 17, NEW YORK

200 South Michigan Avenue
CHICAGO, ILLINOIS

3272 Peachtree Road, N.E.
ATLANTA 5, GEORGIA

13-60

The TRW-330 in the Steel Industry

A TRW-330 digital computer will control the basic oxygen furnaces at Great Lakes Steel Corporation, Detroit division of National Steel Corporation. Given raw-material data and end-product specifications, the TRW-330 will compute and control additive requirements and control the flow rate and duration of the oxygen blow. By correlating data on finished ingot characteristics with records of furnace operation, the TRW-330 will automatically determine the best set of operating conditions for subsequent batches. TRW-330 control will minimize the consumption of raw materials and will ensure product quality.

A TRW-330 can control many other conversion and finishing operations. It can be applied to any control job – large or small – and you pay for only as much computing and control capacity as you need because the TRW-330 is flexible in size. You can later expand your system for data logging and closed-loop control of additional plant operations.

The TRW-330 is ideal for an "evolutionary" control system. The basic computer provides you an economical means of gathering and interpreting data on the operation of a specific process. From this information, a closed-loop control system can be developed, and your TRW-330 can be expanded to do the job while gathering information on other processes. Thus, TRW-330 expandability gives you a gradual, or evolutionary extension of automatic control.

Investigate the TRW-330 in the light of your own requirements today.

TRW Computers Company
a division of *Thompson Ramo Wooldridge Inc.*
8433 FALLBROOK AVENUE, CANOGA PARK, CALIFORNIA

NEW PRODUCTS and equipment

(Concluded from Page 106)

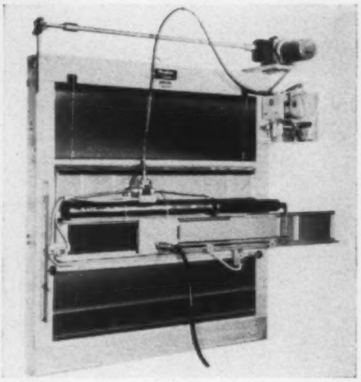
chines. Conversion kits are available for older machines.

For further information, *write* Michigan Tool Co., 7171 E. McNichols Rd., Detroit, Mich.

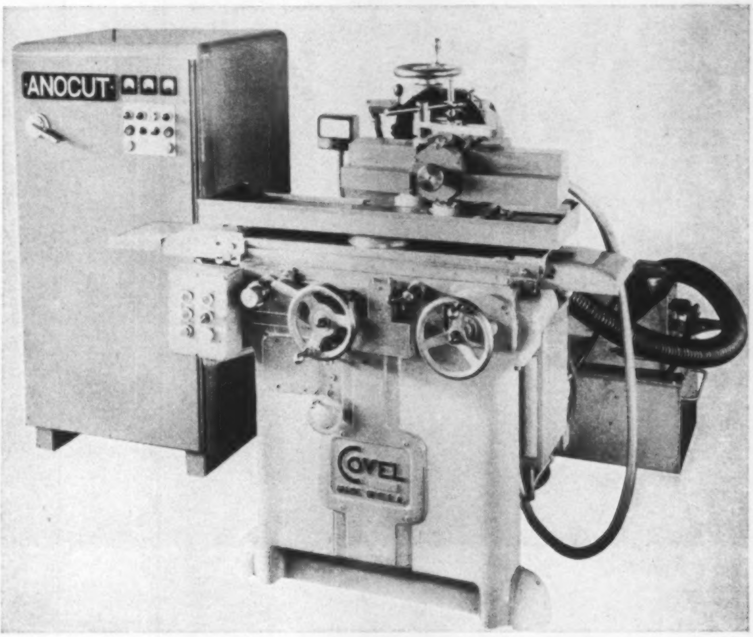
Sandblasting Unit Requires Little Labor

AN AUTOMATIC sandblaster (Model ABC) features labor savings up to 40 per cent over conventional methods, says the manufacturer.

Stroke speed and length are quickly and easily adjusted both horizontally and vertically. The blasting nozzle travels automatically in a continuous, overlapping, zigzag motion. Depth of cut is precisely controlled. A shield around the blast nozzle protects the operator.



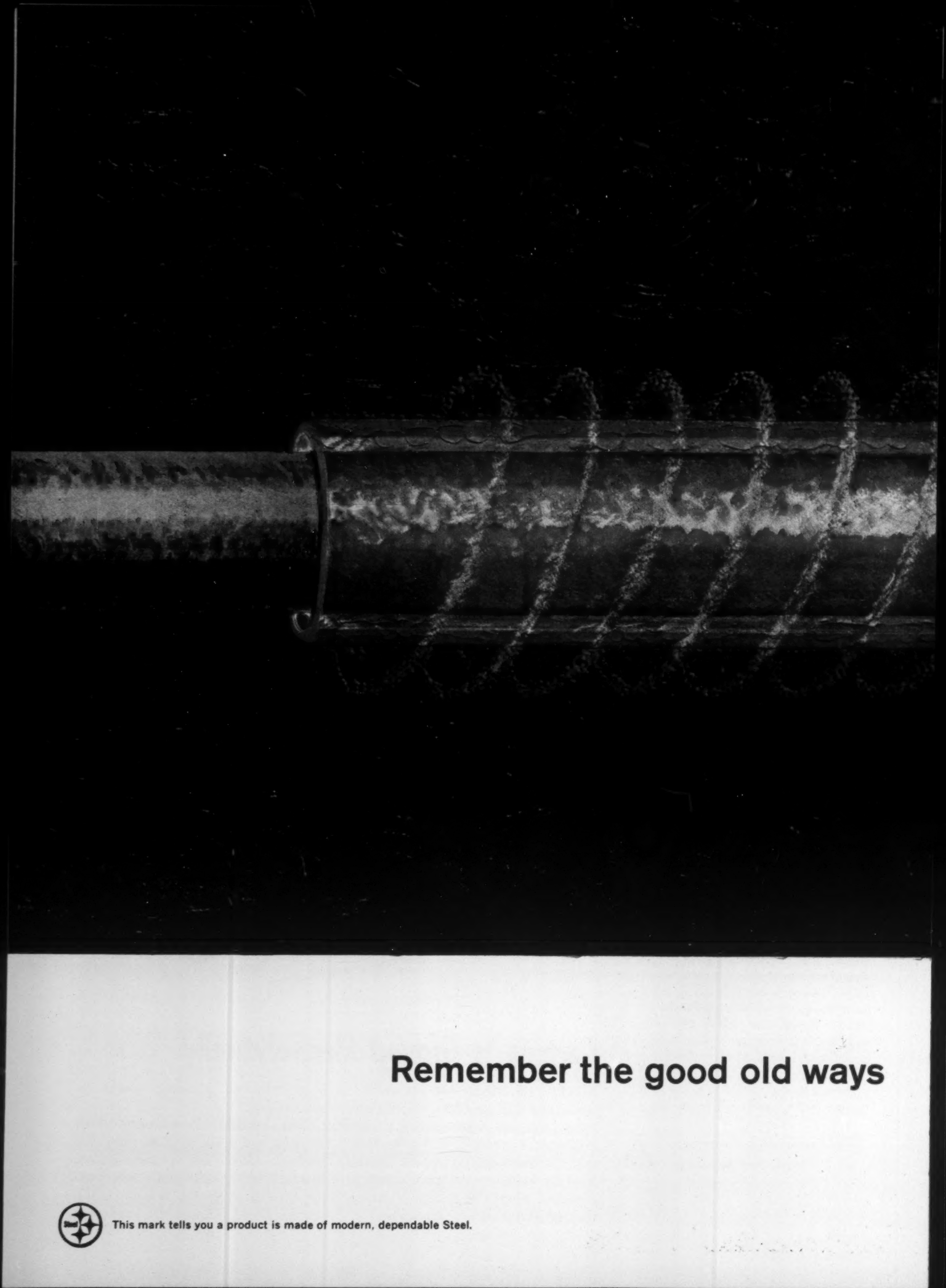
For further information, *write* Dept. 20, Will-Burt Co., Orrville, Ohio.

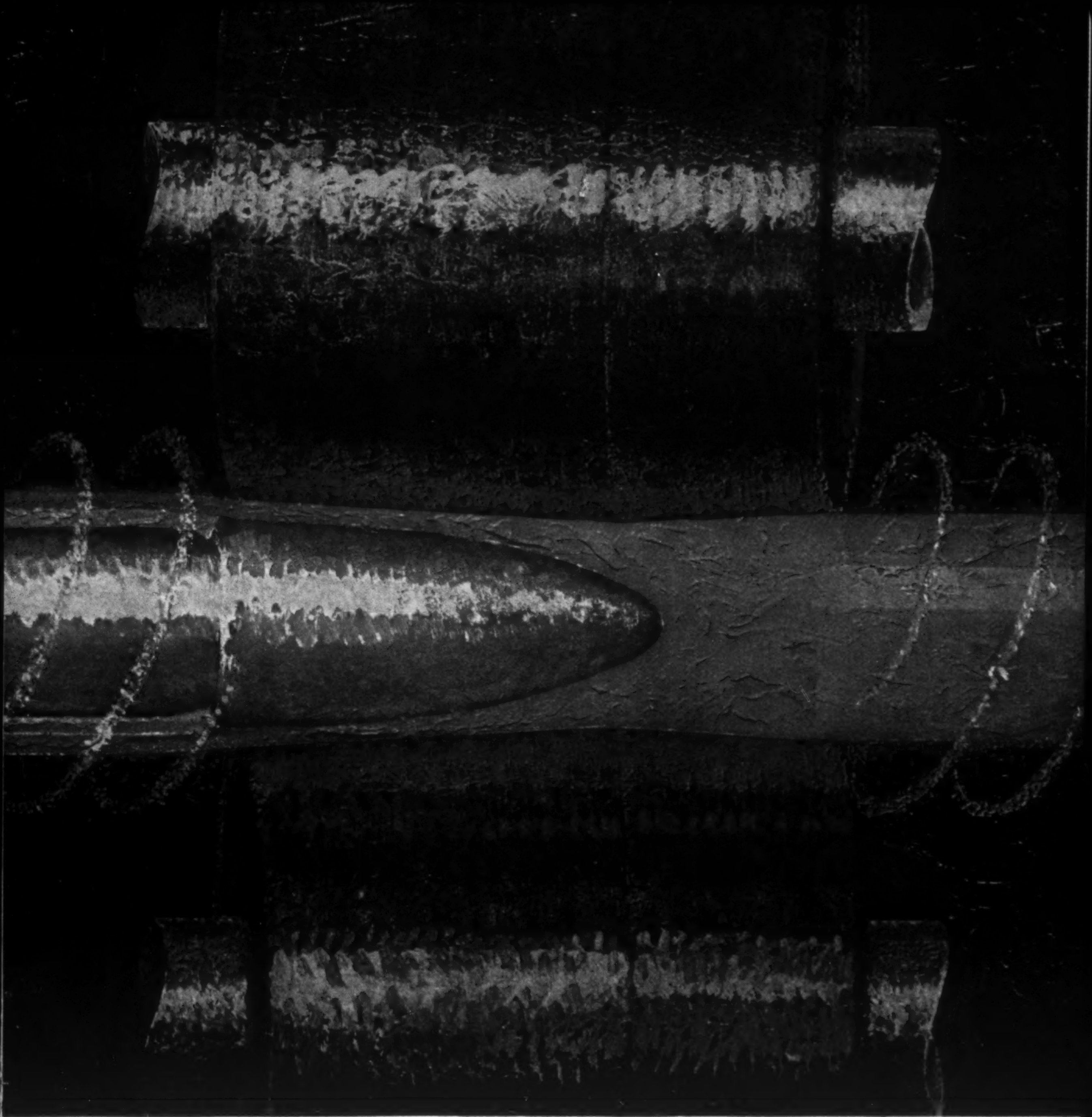


Carbide Is Ground Electrolytically

WITH THE Model 12B electrolytic cutter and tool grinder, you can get three principal improvements in the grinding of carbide: 1. Fast grinding. 2. Increased diamond wheel life (the company mentions a useful diamond wheel life of 5 to 10 times that of conventional methods). 3. Practically no grinding cracks in the carbide.

The spindle is equipped with brushes and a slip ring to carry the current from the power pack through the spindle and to the metal bonded diamond wheel (the minus side). Because the workpiece


Remember the good old ways
This mark tells you a product is made of modern, dependable Steel.



The piercing operation is one of the first steps in creating seamless pipe or tubing from a solid section of steel. After we set the hot steel billet in place, we ram it. Spin it. Push its insides out. And stretch it into a hollow many times longer than the original piece of steel.

There's nothing new about making seamless tubular products this way—we've been doing it for 70 years. This doesn't mean that we're old-fashioned—but sometimes the old ways are best. Whether we use an old established method or a revolutionary new one, whatever is the best way to make pipe or tubing is how National Tube makes it.

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USS

National Tube
Division of
United States Steel

Columbia-Geneva Steel Division, San Francisco,
Pacific Coast Distributors

United States Steel Export Company, New York

is the plus side, the spindle is insulated from the rest of the machine. The spindle head tilts 15 degrees each way for quick setting of clearance angles. The work head spindle holds the cutter to be ground and has brushes with a slip ring to bring the current to the work. An air operated automatic infeed with hydraulic check provides rapid approach, adjustable feed, and automatic return controlled by microswitch with micrometer setting. The table has an automatic reciprocating movement with a stroke adjustable from 0 to $\frac{1}{2}$ in. at a rate of 43 strokes per minute. When plunge grinding, the tool moves across the entire wheel face. Table ways use antifriction ball bearings. A wheel hood consisting of a ring of bristles confines the electrolyte and allows the cutter to be brought to the wheel. All exposed parts of the machine are specially plated to eliminate electrolyte corrosion.

For further information, *write* Covel Mfg. Co., Benton Harbor, Mich.

How our small plant solved its waste disposal problem WITHOUT CAPITAL OUTLAY...

Pat. No. 2,900,096

DEMPSTER-DUMPMASTER Equipped Hauler Provides Containers and Service for Small Fee

Our small Midwestern manufacturing firm did not generate enough refuse to justify ownership of its own refuse disposal system. Yet, it was plagued by unsightly trash piles, fire hazards and scattered refuse in the plant yard.

Our plant engineer then heard of a DEMPSTER-DUMPMASTER equipped private hauler in the adjoining city. A survey revealed that two big-capacity refuse containers, placed one at each end of the plant, would handle the entire refuse accumulation.

The private hauler placed the containers, and a small monthly fee covered maintenance, labor, hauling and dumping refuse. No capital outlay was involved, disposal costs were reduced, and plant housekeeping was vastly improved.

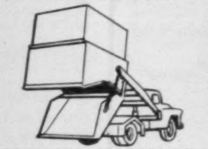
In all major cities, private haulers who own DEMPSTER-DUMPMASTER equipment render fast, efficient, low-cost refuse storage and collection service. They place one or 100 containers at your service for a reasonable fee. A free brochure describes their service in detail.

Free Brochure and Name of Nearest Private Hauler on Request

Dept. S-91, DEMPSTER BROTHERS Knoxville 17, Tenn.

DEMPSTER- DUMPMASTER

DEMPSTER-DUMPSTER



PART OF THE DEMPSTER DUMPSTER SYSTEMS ®

NEW Literature

Write directly to the company for a copy

Soviet Metal Technology

Phases of Soviet metallurgy are outlined in an index to translations available from Primary Sources. Included are more than 300 titles from ten technical journals. The booklet also presents tables of contents for *Tsvetnye Metally* (*Nonferrous Metals*) from January through December, 1960. Primary Sources, 11 Bleecker St., New York 12, N. Y.

Power Wrench Accuracy

Methods for establishing consistent standards for power wrench accuracy are published in a four page folder. It explains how to detect and correct torque output loss in older impact tools and also illustrates how to calibrate power wrenches within 2 per cent accuracy. Skidmore-Wilhelm Mfg. Co., 442 S. Green Rd., Cleveland 21, Ohio.

Aluminum Extrusion Alloys

Aluminum Extrusion Ingot, published by Alcoa, features comprehensive information about extrusion ingot alloys, including data on one new composition and two alloys hitherto unavailable in ingots. Aluminum Co. of America, 726 Alcoa Bldg., Pittsburgh 19, Pa.

Report on Sensors

A four page brochure on sensors describes how optical, infrared, magnetic, electromagnetic, and nuclear devices are used to inspect, control, measure, validate, and detect. Case histories are included. Designers for Industry Inc., 4241 Fulton Parkway, Cleveland 9, Ohio.

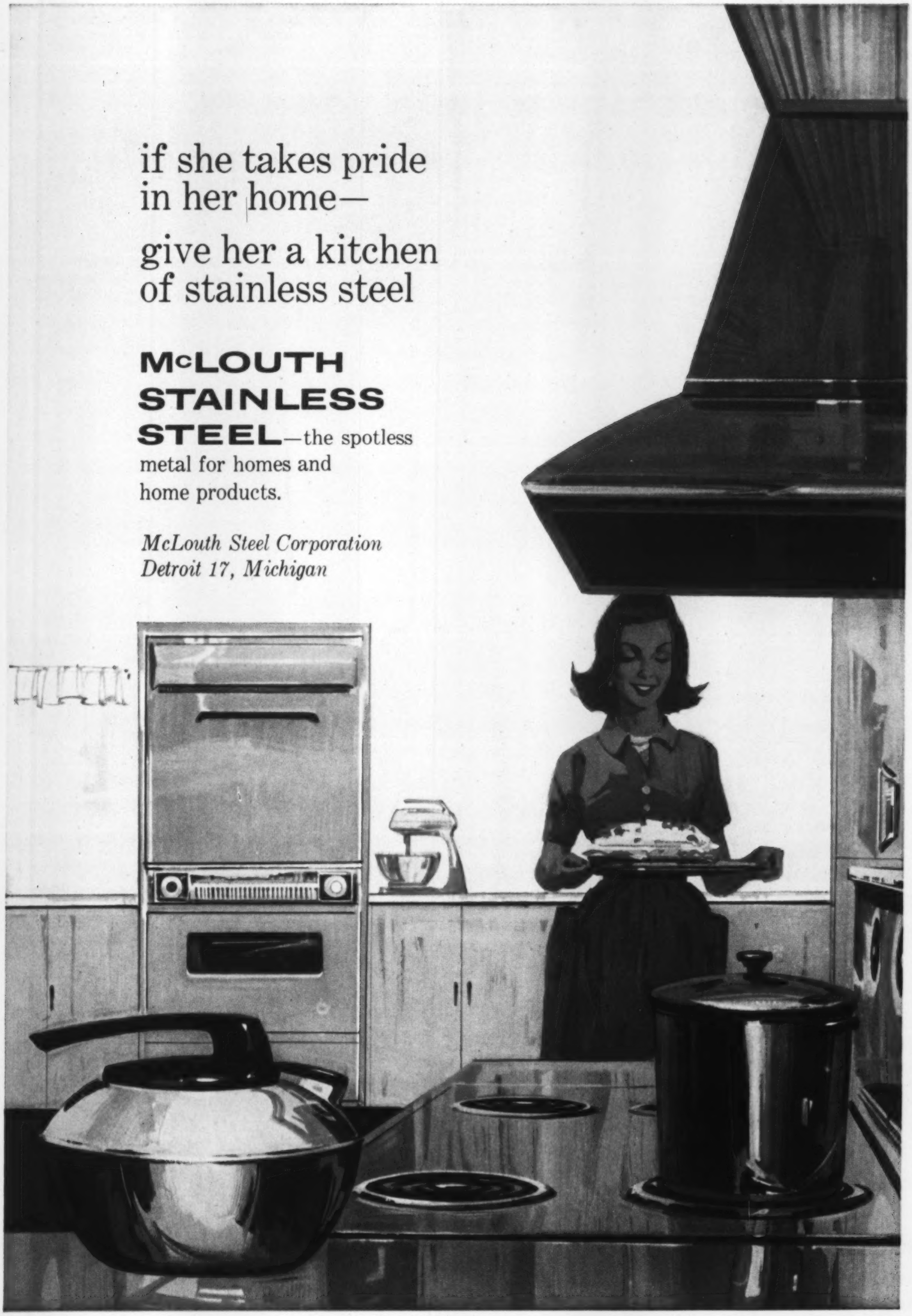
NEW BOOKS

Gear Classification Manual for Spur, Helical, and Herringbone Gears, AGMA 390.01, American Gear Manufacturers Association, 1 Thomas Circle, Washington 5, D. C., $1.50

The manual offers a new system of fine pitch gear classes, tolerances, and backlash data, including a comparison between former AGMA fine pitch classes Commercial 1, 2, 3, 4, and Precision 1, 2, 3, and the new system.

The Continuous Casting of Steel in Commercial Use, K. P. Korotkov, H. P. Mayorov, A. A. Skvortsov, and A. D. Akimenko, translated by V. Alford, edited by H. T. Protheroe, Pergamon Press Inc., 122 E. 55th St., New York 22, N. Y., 171 pages, $7

Described are the designing, starting up, and operation of a continuous casting plant at the Krasnoye Sormovo Works in Russia. Metal quality, power supply, and automation are discussed.



if she takes pride
in her home—

give her a kitchen
of stainless steel

McLOUTH
STAINLESS
STEEL—the spotless
metal for homes and
home products.

McLouth Steel Corporation
Detroit 17, Michigan

HOUGHTON HYDRAULIC FLUIDS and PACKINGS

Here are tips to help you achieve packing-fluid compatibility!

The efficiency, safety and ultimate cost of a hydraulic system is largely dependent on the compatibility of its packings and fluid medium . . . how well they do or do not work together.

Mineral Oils

The above is frequently overlooked when a plant switches from one type of fluid to another. Take *mineral oils*, for example. Three general types are used in hydraulics, and are classified according to their aniline points: high, medium and low.

If, through error, a high aniline oil is used where low aniline oils are specified, rubber seals in the system would shrink and harden. Conversely, "high aniline" rubber seals will swell and soften in low aniline hydraulic oils. Leakage or equipment failure is the result.

To complicate the picture further, mineral oils made to the same specification by different oil manufacturers, using different crudes, will vary in aniline point to the degree that they may cause synthetic rubber seals to either shrink or swell.

Even among the various types of synthetic rubber used for hydraulic seals, the reactions to mineral oils vary. Buna S and Butyl seals, for example, will disintegrate in mineral oil while Buna N, Neoprene, Viton and Thiokol polymers work very well.

Fire-Resistant Fluids

In many hydraulic systems, *mineral oils* are being replaced by modern, synthetic fluids which eliminate fire hazards without affecting hydraulic efficiency.

Three types of fire-resistant fluids are in wide usage and each type requires a *compatible* packing.

The three basic types of synthetic fluids with *recommended* and *maximum recommended* operating temperatures are shown in the box.

Type	Recommended Temperature	Maximum Recommended Temperature
Phosphate Ester	**+130°F.**	**+180°F.**
Water-Glycol	**120°**	**150°**
Emulsion water-oil	**120°**	**150°**

Phosphate Ester fluids and mineral oils have a directly opposite effect on the same rubber seals. Butyl packings which fail miserably in mineral oils, work beautifully with straight Phosphate Ester while Buna N, which works well in mineral oils, is unsuitable for Phosphate Ester. For this reason, changing a system from mineral oil to Phosphate Ester requires a complete and careful flushing and cleaning *as well as a switch in packing materials*, if elastomer packings are used.

For use with these fluids, homogeneous packings should be of Butyl, fabricated packings of Butyl and duck or asbestos and leather packings should be either Wax or Thiokol impregnated.

Water-Glycol fluids are generally compatible with both Buna N and Butyl seals, and with duck or asbestos. However, they do attack leather fibers. Water-Glycols have a pH of 8.5 to 10.5 and leather fibers start to disintegrate at a pH over 8.0

Because of this pH condition, leather packings are not recommended for use with Water-Glycols. Homogeneous packings should be of Buna N and fabricated packings of either asbestos or duck and Buna N.

Emulsion type fluids react much the same as mineral oils do with rubber and leather. In homogeneous and fabricated packings, use Buna N; in leather, use a filler of wax or Thiokol. Never use Emulsion fluids with Butyl.

A Simple Solution

As complex as the subject appears, packing-fluid compatibility in hydraulic systems can be determined with very little trouble. Houghton Packing-Fluid Compatibility Tables will instantly tell you which packings work best with the various types of fluids in general use.

Better yet, Houghton is in a unique position to give you completely unbiased answers to your hydraulic packing-fluid problems, for **Houghton is the only manufacturer who offers you a complete line of both packings and fluids for industrial hydraulic systems.**

FREE! Packing-Fluid Compatibility Tables

COMPATIBLE HYDRAULIC FLUIDS and PACKINGS
HOUGHTON & CO.

For your copy of Houghton's Packing-Fluid Compatibility Table, or for help on any hydraulic packing or fluid problem, call your Houghton representative or write:
E. F. Houghton & Co.,
303 W. Lehigh Ave.,
Philadelphia 33, Pa.

Houghton

INDUSTRY'S PARTNER IN PRODUCTION

Odds Still Favor Price Hike

DESPITE political pressures against higher steel prices, the odds are about 3 to 2 in favor of an upward adjustment around Oct. 1. Reasons:

- The business climate is steadily improving. The Federal Reserve Board's seasonally adjusted index of industrial production is at a record high. Orders for durable goods are on the upswing, and the sales outlook for new cars is excellent.
- Steel demand is nearing a level that industry leaders feel will support an increase. Production is at the year's highest rate (about 74 per cent of 1960 capacity), and there's no letup in sight.
- Steelmaking costs will go up another $2 to $3 a ton on Oct. 1 when the United Steelworkers get the third installment of the wage package they negotiated in January, 1960. Since the last general price increase in August, 1958, the hourly cost of wages and benefits has gone up about 10 per cent, but steel prices have gone down 0.6 per cent.

SELECTIVE INCREASES— Look for a selective price hike averaging $4 to $5 a ton. Action on the big tonnage products—carbon sheets, plates, structurals, and bars—is almost a certainty. Less likely to be bumped are products that face stiff competition from imports, other metals, and nonmetallics. They include tin plate, reinforcing bars, electrical conduit, and merchant wire products. Stainless steel producers would like to boost their prices at least enough to compensate for the June 30 boost in the price of nickel. Since the recent price cutting in stainless has resulted mainly from sharp competition among distributors, it doesn't preclude an upward adjustment at the mill level. Producers of rigid steel conduit will probably hold the line. Reason: Competitive conditions have forced them to reinstate a 5 per cent discount.

By raising their prices $4 to $5 a ton, steelmakers will recover only part of the added costs that they've incurred since the last price hike. On Oct. 1, the cumulative impact of employment cost increases since August, 1958, will be at least $8 a ton on finished steel.

IMPORTS A DETERRENT— Industry observers cite the continuing threat of imports when they predict that steelmakers won't adjust prices across the board. Latest figures from the Department of Commerce show that imports of steel mill products spurted to 277,000 tons in June, the highest level in 14 months. Exports slipped to 146,000 tons. In the first half, we had a foreign trade deficit volumewise—exports of 890,000 tons vs. imports of 1,286,000 tons—but a favorable balance dollarwise. Our exports were valued at $198 million. Imports were worth $161 million.

BANNER MONTH FORESEEN— Barring an impasse in auto labor negotiations and a protracted strike, steelmakers expect September to be a banner month. Demand from the construction industry, appliance manufacturers, and other consumers is well sustained. Orders for fabricated structural steel in July soared to the highest monthly total since December, 1956. As leadtimes on some products lengthen, users are giving more thought to increasing their inventories.

PRODUCTION STEADY— Look for ingot production in the week ending Sept. 9 to be close to the 2.1 million tons that STEEL estimates the industry poured in the week ended Sept. 2. Output then was 4 per cent higher than the previous week's. August production was about 8.7 million ingot tons, up sharply from July's 8.1 million.

WHERE TO FIND MARKETS & PRICES

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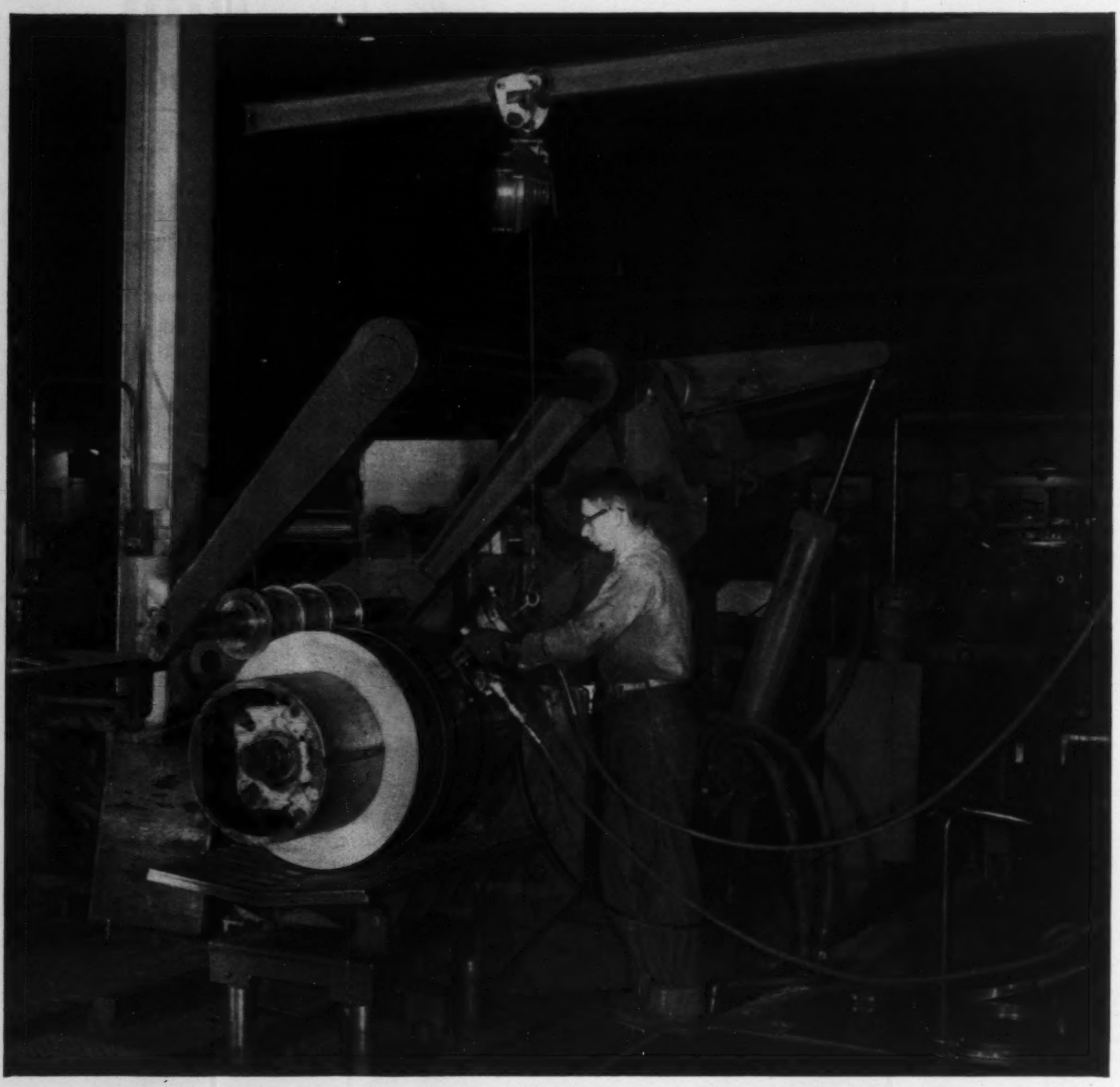
*Current prices were published in the Aug. 28 issue and will appear in subsequent issues.



Strip steel coils strapped fast

With a Signode air-power tensioner and air-power sealer, this operator puts a strap around a coil complete in a few seconds. Straps are uniformly tight and securely sealed. Strapping the coils on the mandrel simplifies further handling. The strapping is taken directly from the dispenser behind the operator. There's no waste of strap.

This time-saving use of Signode steel strapping is one of many hundreds in major steel mills and in steel service centers across the country. It is typical in that the method—of which the right strapping tools are a part—is near-perfect for the job because of the interested attention of an experienced Signode man. May we have such a man help you? A new 4-page folder, "Air Power Tensioners and Sealers" is yours for the asking. Write for your free copy today.

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First in steel strapping

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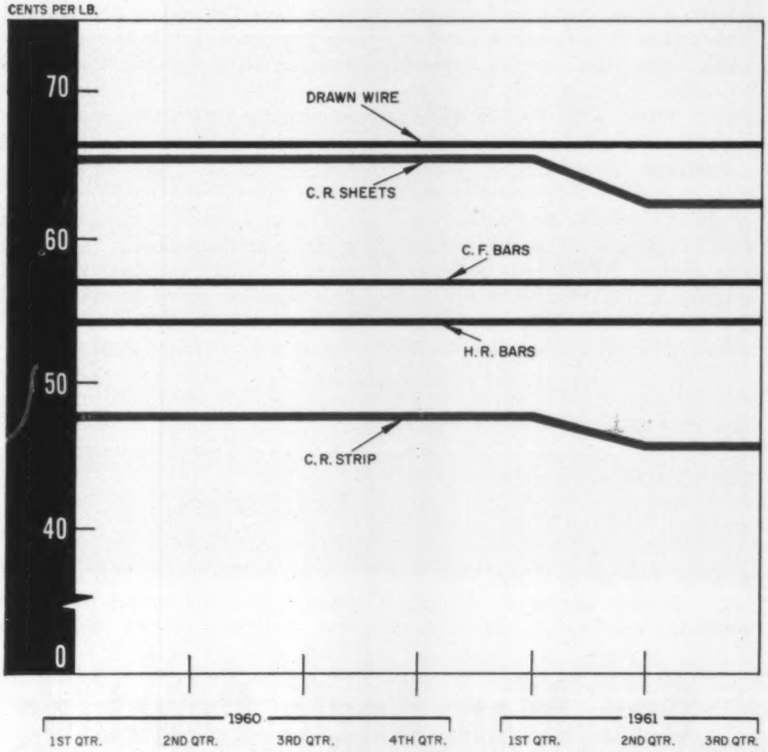
'Price Fighting' Plagues Stainless



PRODUCERS of stainless steel are on the horns of a price fighting dilemma.

The trouble is at the distributor level—principally in the sale of cold rolled sheets. Repercussions are being felt at the mill level because direct mill customers press for below-mill prices being quoted by service centers.

• An Absurdity—The freakish market situation (warehouses underpricing their sources of supply) results from a combination of circumstances, some tracing back to the early days of the stainless business. The immediate cause for the unstable market: Willingness of the service centers to give away a substantial part of their functional discount of 10 per cent from posted mill prices.

Price shaving was initiated months ago by some distributors who were seeking to cut a niche in the market.

Others followed suit to stay competitive.

• Meets Competition—In June, a leading service center chain announced a 6 per cent discount on stainless cold rolled sheet orders of 2000 to 9999 lb and 5 per cent on orders of 1000 lb or more. That meant the warehouse functional discount was about cut in half, resulting in distributor prices on sheets below the published mill level.

The market had scarcely adjusted to that break when another leading stainless distributor in the Midwest, in mid-August, shaved prices further, permitting purchases of cold rolled sheets at the 10,000 lb mill base price, less 8 per cent. That left the distributor only 2 percentage points of the functional mill discount to cover costs and provide a profit. Industry leaders say they must get at least 5 to 6 per cent just to break even. The mills deny they have increased their functional discount to any of their distributors beyond the standard 10 per cent.

• Flat Rolled Prices Off—With two exceptions, published mill prices have held firmly for many months —cold rolled sheets were reduced 1.5 cents a pound and cold rolled strip 2 cents a pound last spring (see chart). There has been no general change in the mill market since then, despite the June 30 increase in nickel prices. (Nickel is an important constituent of some stainless grades.) One stainless producer boosted prices on nickel-bearing stainless products July 5, but the action wasn't generally followed.

In any case, the sheet and strip market is still in a turmoil, and the producers don't know what to do about it. They can't lower their published prices to the present warehouse market level, nor can they eliminate the functional discount, or increase the base quantity substantially without penalizing many of their long established and valuable service center connections. That's important since more than 60 per cent of their stainless sheet output moves into consumption through the distributors.

• Concessions Sought — Direct mill customers are seeking the lower prices quoted at the warehouse level. Some mills are meeting the problem by serving customers through their warehouse connections. However, some buyers object to the diversion of orders because it makes for confusion in purchasing records.

• Excess Capacity—There is some excess stainless production capacity, and newcomers in the field (both producers and distributors) add to the difficulties of maintaining a stable market. In the early days, the mills disposed of their output through the service centers because the bulk of demand then was largely in small lots. Over the years, the older producers made connections with the larger and more stable distributors. In time, mill-warehouse promotional efforts developed a broad consumer following. Newcomers have found it hard to break into the market, which prompted price cutting on their part. That, basically, is what's back of the present price instability.

Producers anticipate an annual growth of 4 to 5 per cent in consumption over the long term. Last year, shipments of stainless products totaled 566,303 net tons, averaging 47,191 tons monthly. Of the total, 23,629 were hot rolled sheets, 136,645 cold rolled sheets, 5834 hot rolled strip, and 180,665 cold rolled strip. Shipments in the first six months this year averaged 44,260 tons monthly. Cold rolled sheet shipments averaged 11,900 tons monthly vs. 11,387 tons monthly in all of 1960.

- **Sales Increasing**—Sales are rising. August shipments of strip producers will be 40 to 50 per cent over July's. Some mills say their August business will be up 100 per cent. Some new orders are for late fourth quarter shipment, indicating that service centers intend to build inventories toward yearend. That's contrary to the normal pattern, and suggests some distributors expect a booming demand and fear deliveries may become extended. Some may be hedging against a possible mid-year steel strike in 1962. A little hedging against a possible price increase this fall is reported.

The upswing in demand does not apply to stainless sheets. One mill notes a "slight improvement" but says most of its customers "aren't buying anything they don't need." Sheet sales officials think the instability of prices is retarding business. Buyers are afraid to commit themselves without checking the prices of all possible suppliers.

Distributors . . .

Prices, Page 136

Steel service centers had a modest improvement in business in August and anticipate bigger pickup in September. Demand for plates is showing a spurt in many districts.

Mills are still offering prompt shipment of most products, but delivery promises on structurals are more extended than they were in July. Shapes that were available within two weeks are quoted at three to four weeks.

High Tariffs Will Hurt Us, Glossbrenner Maintains

Efforts must be made by U. S. steelmakers to regain the world markets they've lost to foreign competition, declares A. S. Glossbrenner, president, Youngstown Sheet & Tube Co., Youngstown, but he thinks that high tariff walls will not turn the trick. Some congressmen have been advocating high tariffs to protect certain industries.

"Tariff walls," said Mr. Glossbrenner, "would not only keep out the foreign steel, but they also would keep in our steel. And they would also keep many other U. S. businesses out of those world markets that we urgently need.

"We're just about out of the export business," said the steel executive. Foreign producers, with the advantages of low wages and the most modern production techniques, are underselling U. S. producers in the U. S. domestic markets as well as in world markets, where we once had the advantage, he added.

Mr. Glossbrenner feels that the solution lies in enabling U. S. producers to compete more effectively by gaining the co-operation of workmen to raise productivity, more realistic depreciation allowances, and improved monetary control.

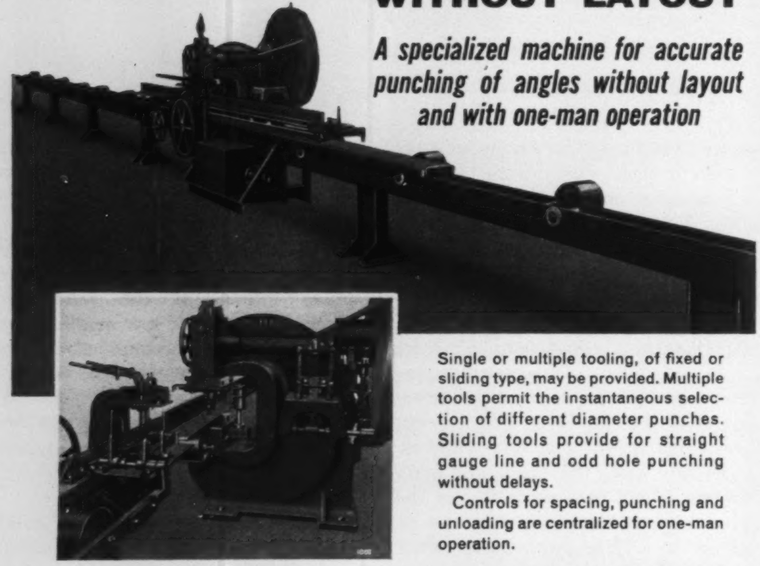
Tubular Goods . . .

Tubular Goods Prices, Page 135

Buttweld pipe is moving steadily from the mills, maintaining the moderate pace reported the last couple of months. Construction needs have given the market a much needed push, and the pace is expected to hold pretty much the rest of the building season.

Oil well drilling in the U. S. and Canada reached a high for the year in the week ended Aug. 21. The active rotary rig count by the Hughes Tool Co. showed the total at 2014, five above the previous week. The U. S. total was 1862, of

One-Man Angle Punching
WITHOUT LAYOUT
A specialized machine for accurate punching of angles without layout and with one-man operation



Single or multiple tooling, of fixed or sliding type, may be provided. Multiple tools permit the instantaneous selection of different diameter punches. Sliding tools provide for straight gauge line and odd hole punching without delays.
Controls for spacing, punching and unloading are centralized for one-man operation.

Write for Bulletin 313A

The trend is to Thomas

69

THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH 23, PA.

which 560 were operating in Texas. Canada had 152 rigs operating. A year ago the U. S.-Canada total was 1882.

Price Trend Still Mixed On Imported Steel Items

Prices on steel imported from Europe continue mixed. While plusses exceed minuses in current postings, quotations on some products show no change. I-beams and plates are up 10 to 20 cents per 100 pounds, depending on districts. Channels, bands, and merchant bars are off 10 cents, and nails 5 cents. Products on which prices are unchanged include bar size angles, structural angles, and barbed wire.

Tin Plate . . .

Tin Plate Prices, Page 131

Order volume is disappointing in the tin plate market, users seemingly uncertain about placing orders because of recent innovations in manufacture. Future buying is being done cautiously and involves reduced tonnages.

The big question in the trade appears to be whether large applications will be for standard weights of tin plate or the new lightweight classification. If the latter, what weight will prove most popular? Also, another question concerns the desirability of cold reducing after tin plating, or vice versa.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 130 & 131

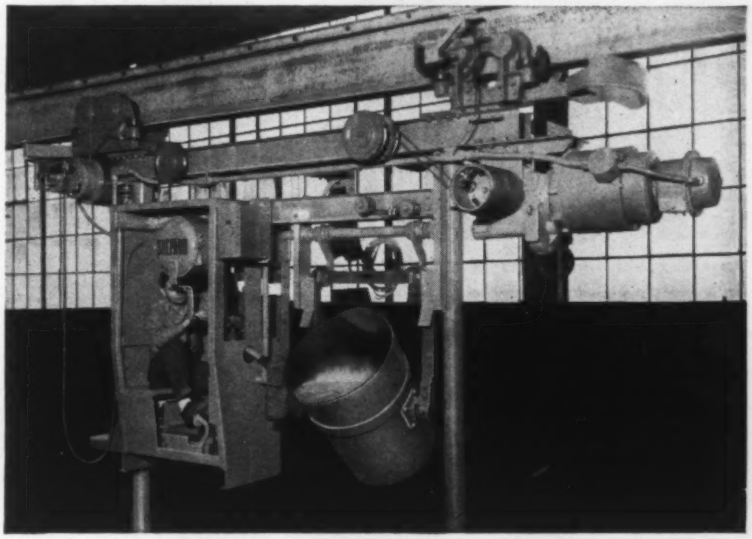
Some consumers are placing slightly heavier orders for sheets for September and October shipment, but there's little indication that they are bolstering their inventories to any marked extent.

Any lengthening of mill deliveries, however, is certain to speed up buying and may cause production men to build stockpiles as a hedge against possible shipment delays. Some millmen think September shipments will climb to new highs for 1961.

Ending of the vacation season at many shops is reflected to some extent in the general pickup in demand. Some small hedge buying against a possible price increase next month is also reported. Automotive buying continues to lag and not

(*Please turn to Page* 125)

JOB-MATED



for Hot Metal Handling

Shepard Niles Hot Metal Carrier

It only takes **one man** to move and pour hot metal — swiftly and safely — with a Shepard Niles Hot Metal Carrier. And because each carrier is **JOB-MATED** — built with the components best suited to meet **your** exact on-the-job conditions — it will last longer, require minimum maintenance and practically no downtime. Care like this in our plant means significantly lower cost operation in yours.

For full details on this labor-saving method of low-cost handling, write for latest bulletin. Ask to have a Shepard Niles representative call.

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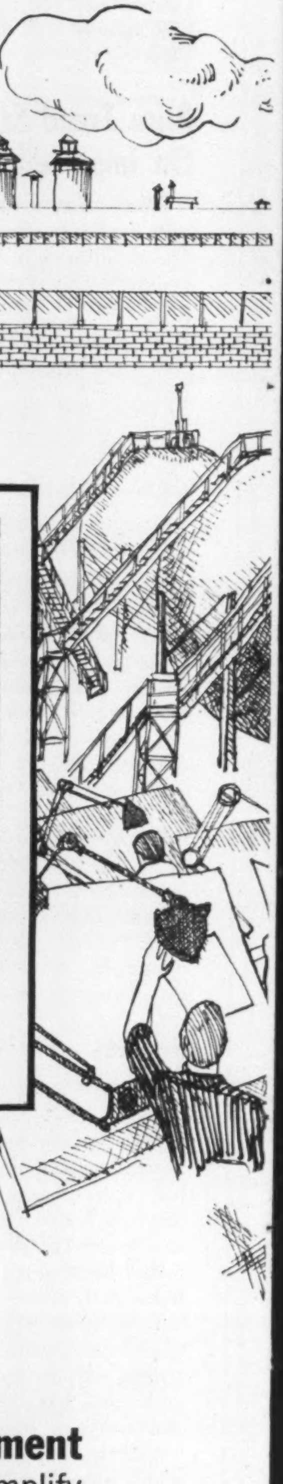
US RUBBER AT THE HEART OF INDUSTRY...



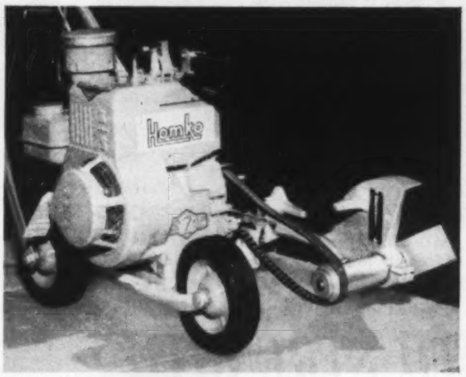
Helping to set a world speed record . . . a U.S. PowerGrip "Timing"® Belt is the key link in the drive train of this Mercury outboard. U.S. "Timing" Belts' positive tooth engagement prevents slippage, insures perfect synchronization. These belts have high flexibility and strong gripping teeth, are backed by steel cord, permit more compact sheaves, need no maintenance.

TB 103

Wherever the design and production of power equipment is involved, you'll find US Industrial Rubber Products...helping to simplify the design, improving the efficiency and reliability of equipment both new and old, adding to the profit of manufacturer and operator alike.

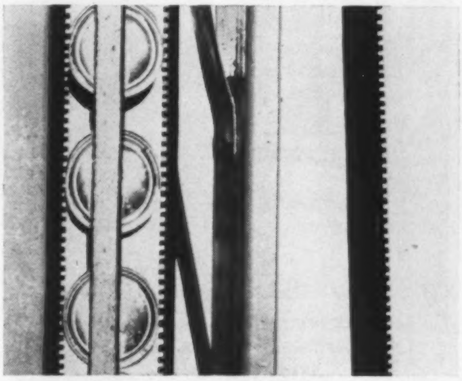
Providing better steering control for Clarke's new Power Sweeper, a U.S. PowerGrip Flexible Coupling has eliminated cumbersome, costly metal parts and their need for lubrication... provides quieter, cushioned, yet responsive steering. These easily installed couplings not only compensate for lateral and axial misalignment, but reduce vibration and absorb jarring shocks.

FC 103



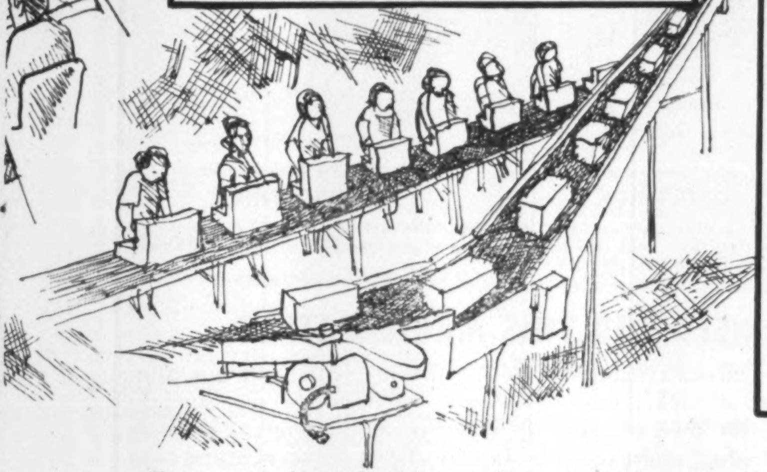
Chosen for overall top performance, U. S. Royal V-Belts drive the edger blade on Western Tool & Stamping Company's powerful Edger-trimmer. These belts must withstand oil, dust, weather, and twisting. They must also deliver top performance at many different engine speeds. U.S. Royal V-Belts do the job... were chosen because they outperformed all competitive belts.

VB 104



"Nothing short of spectacular," says an Anheuser-Busch brewery manager about two U. S. SteepGrade Conveyor Belts that lift wet 16-oz. beer cans at a 90° angle. The secret of this non-slip operation is SteepGrade's "gripper cleat" construction which holds the cans firmly, yet gently, allows less pressure and belt speed, eliminates damage to cans and smearing of print.

CB 124



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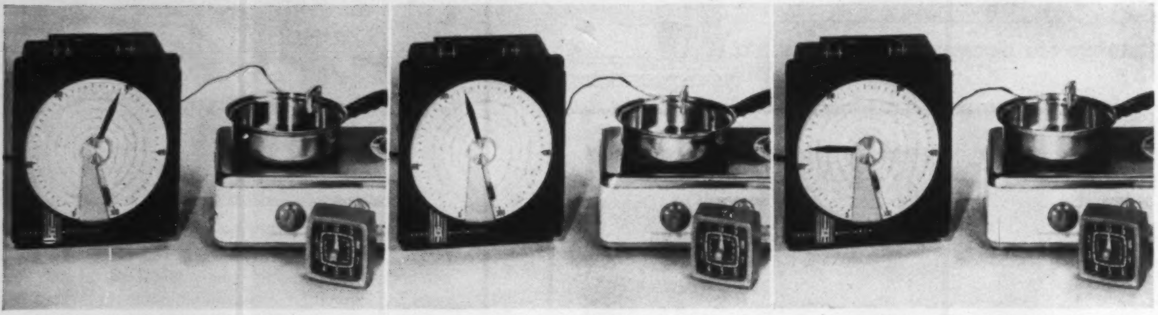
MECHANICAL GOODS DIVISION

EVEN DOUBLE THE THICKNESS:

Fairmont Stainless Clad Aluminum sheet gives you FASTEST, MOST UNIFORM HEAT TRANSFER



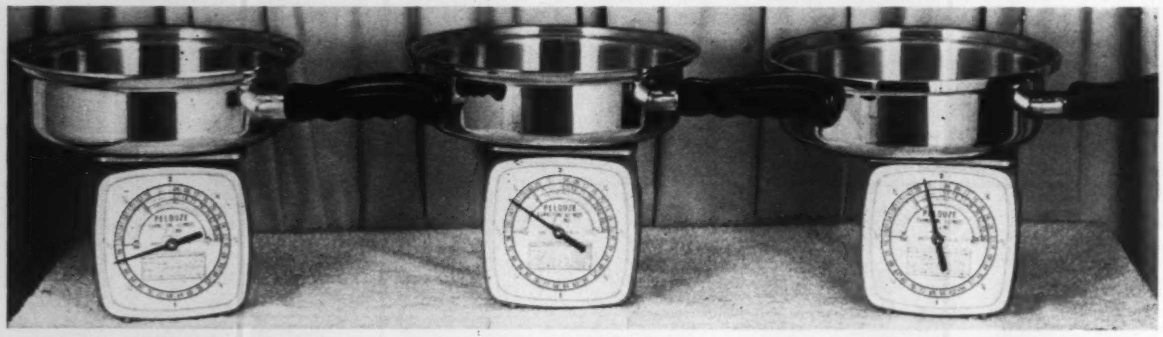
Fairmont Stainless Clad Aluminum
.100 THICK

Copper Core Stainless
.050 THICK

Carbon Core Stainless
.050 THICK

After five minutes at maximum distance from controlled heat source, pan made of Fairmont Stainless Clad Aluminum, even though double thick, shows 290° F at side wall—in comparison with 230° F for copper core pan and 120° F for carbon core pan. Utensils furnished by courtesy of Vita Craft Manufacturing Company. The testing devices courtesy, Leeds & Northrup.

LIGHTEST WEIGHT, WITH STRENGTH



Fairmont Stainless Clad Aluminum
.100 THICK

Copper Core Stainless
.050 THICK

Carbon Core Stainless
.050 THICK

Although twice as thick and correspondingly strong, the Stainless Clad Aluminum pan weighs up to ⅓ less than the copper core or carbon core pans. This means lower shipping costs. Also, increased sales appeal to Mrs. Homemaker, who will simply love a sturdy pan that's nevertheless easy to lift.

WHAT'S YOUR NEED FOR THIS MAGIC METAL?

2 plus 2 equal 4. And Fairmont Stainless Clad Aluminum—with its unique combination of the strength and corrosion resistance of stainless steel permanently bonded to the light weight, good conductivity of aluminum—adds up to a bonanza in business-building product improvements. In many fields. From pots and pans to appliance and automotive trim, to architectural components. Whatever your line, the above has given you ideas. Let us help you with them. Write for further information. Or phone your local Fairmont office for a Fairmont field engineer.

FAIRMONT ALUMINUM COMPANY

SUBSIDIARY OF **CERRO CORPORATION**

Sales Offices in Principal Cities

FAIRMONT • WEST VIRGINIA
FAIRMONT 3010 • CABLE ADDRESS: FARMON

(*Concluded from Page* 121)

much volume is expected to develop in that area of the market until present labor contract negotiations are out of the way. Market observers think automotive demand will be unusually pressing this fall if a strike is averted.

Galvanized sheets still top demand in the product list, and there's no indication buying will fall off soon.

Most cold rolled strip users' stocks have been lowered to a point they'll have to return to the market soon for tonnage to support their fourth quarter operations.

Steel Bars . . .

Bar Prices, Page 129

While some consumers are ordering bars a little more actively, overall demand continues to lag. Largely responsible for the relative inactivity in the market is the absence of active demand from automotive customers. Sellers are still hoping for heavy auto demand later this month.

Manufacturers with defense contracts, notably the M-14 rifle, are placing forward orders. They are now meeting their production goals.

Most cold drawn bar producers are not fully covered on their hot bar requirements and are taking prompt shipments from stocks of smaller sizes. The forge shops are not anticipating needs either, but it's expected they'll begin forward buying next month.

U. S. Steel Corp., Pittsburgh, booked 222 tons of hot rolled, annealed, alloy rounds for the Rock Island (Ill.) Arsenal.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 130

Public construction is providing a strong demand for reinforcing steel all over the country. Road building and school projects are particularly prominent in current activity. However, considerable tonnage is also being moved on commercial account, while substantial demand is reported for steel required in churches, hospitals, and similiar structures.

Pending work includes 1000 tons of bars for a Bureau of Reclamation project in Montana and 7500 tons for a freeway in Seattle. Considerable tonnage is pending for roadwork.

Connors Steel Div., Birmingham, H. K. Porter Company Inc., is constructing a new reinforcing bar facility at a cost of $500,000. Included in new equipment will be alligator shears, a modern bending table, a conveyor system, and modern overhead cranes.

Wire . . .

Wire Prices, Pages 131 & 132

Imported wire products continue to hurt at seaboard points, but domestic wire business is reported improving. Bookings for September shipment are up about 10 per cent, say some mills. Buying for October shipment indicates volume that month may be the best this year.

The improvement in demand is largely for industrial specialties. Orders from suppliers to the automotive industry are perking up a bit, notably for October. Demand from the fastener makers also is heavier, though most of the buying is for nearby production. Most consumers still are seeking to hold down inventories.

Wire products for road construction are moving actively, but demand falls considerably short of capacity.

Structural Bookings Jump To 5 Year High in July

Fabricated structural steel bookings jumped to a five year high in July, reports the American Institute of Steel Construction, New York. Totaling 456,332 tons, orders were the highest since December, 1956. They were 53 per cent above the preceding month's total and 51 per cent over the June, 1960, figure.

The upturn, says the institute, is the result of increases in commercial and public construction.

Bookings in the first seven months were 2,315,157 tons, an increase of 3 per cent over those in the like period a year ago.

July structural shipments of 286,917 tons were off sharply compared with 361,159 tons in June and 338,860 in July a year ago. Shipments for the first seven months this year totaled 2,145,877 tons vs. 2,173,505 in the same period of 1960, a decline of 1 per cent.

Order backlogs as of July 1 totaled 2,517,052 tons, of which 1,428,907 tons (57 per cent), are scheduled for fabrication within the four months ending Nov. 30.

Structural Shapes . . .

Structural Shape Prices, Page 129

Fabricators are placing orders for plain structurals in line with new bookings. Order backlogs vary widely among the fabricating shops. Firms not meeting going price competition are not faring as well as the price cutters. Efforts to firm up the market so far have met with little success.

Current demand includes 5000 tons for bridges in New England, of which 3265 tons are for Connecticut projects. The Bonneville Power Administration takes bids Sept. 15 on 665 tons of tower steel. Bids are in for three Alaska state ferries requiring 1715 tons of shapes and 3500 tons of plates.

Two, welded plate, steel girders, each weighing 47 tons, were shipped recently from the Birmingham plant of American Bridge Div., U. S. Steel Corp. The girders, 175 ft long, spanned four flatbed cars. They will be used in construction of a railroad overpass in the Little Rock (Ark.) expressway complex. Two more identical girders are scheduled to be shipped from the same plant for the same project.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

20,000 tons, 50 story office building, 277 Park Ave., New York, through Cauldwell-Wingate Co., general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

5675 tons, Terminal Railroad bridge, Kansas City, Kans., to American Bridge Div., Pittsburgh, U. S. Steel Corp.; bids to the U. S. Engineer, Kansas City, Mo.

600 tons, addition, St. Mary's Hospital, Waterbury, Conn., to the Berlin Construction Co., Berlin, Conn.; E. & F. Construction Co., Bridgeport, Conn., general contractor.

500 tons, Pershing Road bridge over South Expressway, Chicago, for the City of Chicago, to Wendnagel & Co., Chicago; Consolidated Construction Co., Chicago, contractor.

730 tons, hangar, project MPA-1, Logan Airfield, East Boston, Mass., to A. O. Wilson Structural Co., Cambridge, Mass.; Vappi & Co. Inc., Cambridge, general contractor.

STRUCTURAL STEEL PENDING

1125 tons, nine state bridges, relocation of Route 2, Gardner, Mass.; Bayer & Mingolla Construction Co., Worcester, Mass., low on the general contract.

665 tons, tower steel, leg extensions and special items, delivery to two Montana points, and Mead, Wash.; bids to the Bonneville Power Administration, Portland, Oreg., Sept. 15.

515 tons, state motor vehicle department office building, Wethersfield, Conn.; Southern New England Contracting Co., Hartford, Conn., low on the general contract.

245 tons, three state bridges, including one, 4 span steel stringer structure, Springfield, Mass.; M. De Matteo Construction Co., Quincy, Mass., low on the general contract.

Steel Ingot Output Hits New Peak Since May, 1960

STEELMAKING operations have risen to the highest level since the week ended May 9, 1960. Output increased to 2.1 million tons for the week ended Sept. 2 from 2,020,000 tons the preceding week. The upswing will be checked only slightly by observance of the Labor Day holiday in the week ending Sept. 9.

- **Pittsburgh**—Output for the week ended Sept. 2 climbed to about 411,000 ingot tons, highest for any week this year. Operations jumped 3 points to 69.5 per cent of 1960 capacity as U. S. Steel Corp. reactivated six of 16 open hearths at its Edgar Thomson Works, Braddock, Pa. Despite Labor Day, production in the week ending Sept. 9 is expected to equal that of the week just ended.

- **Youngstown** — The district's operating rate rose 5 points for the week ended Sept. 2 to 63 per cent of 1960 capacity. Youngstown Sheet & Tube Co. put into operation one more open hearth at its Brier Hill Works, reflecting an upturn in orders for seamless pipe.

U. S. Steel Corp. will dismantle its two idle bessemer converters here, taking slightly more than 500,000 tons off the district's steelmaking capacity.

- **Buffalo** — Steel production is steady at about 56.5 per cent of capacity. Bethlehem Steel Co. is operating 17 of 35 open hearths, including most of its newer and larger furnaces, some with oxygen. Republic Steel Corp. is working four of nine open hearths; Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., two of three.

- **Chicago** — Production of ingots rose 2 points during the week ended Sept. 2 to 73 per cent of 1960 capacity. The higher rate is anticipatory of increased volume for September. Producers are strengthening their inventories of semifinished products.

- **Philadelphia**—A slight leveling off in production in the Northeastern District was noted in the week ended Sept. 2. This followed a 2 point increase in the AISI index to 116 for the week ended Aug. 26.

- **Cincinnati** — Steel production in the week ended Sept. 2 rose about 1 point to a rate slightly above 72 per cent of 1960 capacity.

- **Birmingham** — The steelmaking rate here rose about 1.5 points for the week ended Sept. 2 to 66.5 per cent of 1960 capacity.

- **Los Angeles**—Production in the Western District is holding at 75 per cent of 1960 capacity. Only minor changes are reported.

- **Cleveland**—Steel mills have raised production schedules for five consecutive weeks and are turning out the largest tonnage since the final week of June.

Semifinished Steel . . .

Semifinished Prices, Page 129

New buying of finished steel products is holding close to the faster pace of the last couple of weeks. Most encouraging to the mills is the fact orders are coming in from a larger cross-section of customers. That means that even though automotive tonnage is limited, overall steel demand is increasing.

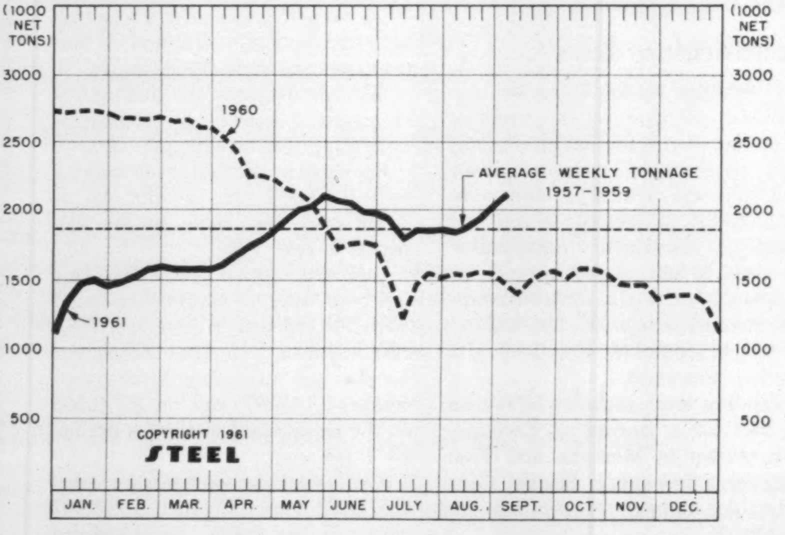
At least three months of rising production is anticipated, with an appreciable pickup in auto buying giving the production curve a mighty upward push. The strong uptrend in steel production at present reflects in part a certain amount of inventory building of semifinished steel by the mills. The prospects for increased demand for finished steel over the rest of the year make it desirable for them to have somewhat larger stocks.

STEEL INGOT PRODUCTION

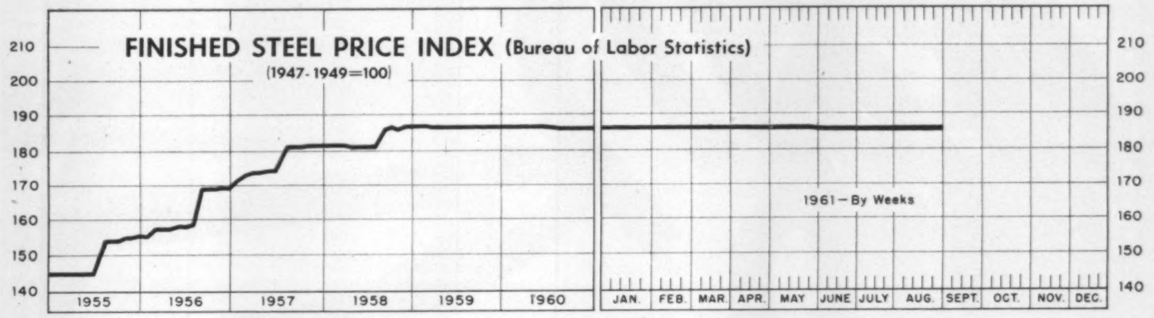
Weeks Ended	Net Tons	Change
Sept. 2	2,100,000*	+ 4.0%
Aug. 26	2,020,000	+ 3.9%
Aug. 19	1,944,000	+ 1.8%
Totals to Aug. 26		
1961	60,110,000	−16.9%
1960	72,302,000	

DISTRICTS	Week Ended —Aug. 26— Tons‡	Index†	Week Ended Aug. 19 Index†
Northeastern	309,947	116	114
Buffalo	90,540	93	90
Pittsburgh	391,443	97	90
Youngstown	163,182	96	96
Cleveland	110,188	119	109
Detroit	140,589	134	128
Chicago	407,743	109	106
Cincinnati	85,962	114	109
St. Louis	65,688	125	115
Southern	120,320	111	110
Western	136,788	117	115
Industry	2,020,000	108.4	104.4

*Estimated by STEEL.
†1957-59 (1,862,933 tons) = 100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

(1947-1949=100)

Aug. 29, 1961	Week Ago	Month Ago	Aug. Index	Year Ago
185.6	185.6	185.6	185.6	186.2

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Aug. 29

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1 ...	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	(N.A.)
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.775
Sheets, C.R., Stainless, 302 (lb)	0.643
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.225
Strip, C.R., Stainless, 430 (lb)	0.460
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.495
Pipe, Galv., Buttweld (100 ft)	23.098
Pipe Line (100 ft)	195.423
Casing, Oil Well, Carbon (100 ft)	193.028
Casing, Oil Well, Alloy (100 ft)	302.645
Tubes, Boiler (100 ft) ...	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	192.285
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box) ...	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon ...	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (Bundles)	7.647
Nails, Wire, 8d Common.	9.433
Wire, Barbed (80-rod spool)	8.372
Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	Aug. 30 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg = 100)..	247.82	247.82	247.82	247.82	225.71
Index in cents per lb	6.713	6.713	6.713	6.713	6.114

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$137.75
No. 2 Fdry, Pig Iron, GT .	66.49	66.49	66.49	66.49	62.63
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	62.18
Malleable Pig Iron, GT ...	67.27	67.27	67.27	67.27	63.41
Steelmaking Scrap, GT ...	38.67	38.33	37.83	32.67	58.83

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Aug. 30 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	5.075
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	5.075
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.975	4.93
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.85
Shapes, Std., Pittsburgh ...	5.50	5.50	5.50	5.50	5.00
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	5.00
Shapes, deld., Philadelphia .	5.745	5.745	5.745	5.77	5.00
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.85
Plates, Chicago	5.30	5.30	5.30	5.30	4.85
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	5.25
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.85
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	5.35
Sheets, H.R., Pittsburgh ...	5.10	5.10	5.10	5.10	4.675
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.675
Sheets, C.R., Pittsburgh ...	6.275	6.275	6.275	6.275	5.75
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.75
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.75-5.85
Sheets, Galv., Pittsburgh ...	6.875	6.875	6.875	6.875	6.30
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.675
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.675
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.85
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.95
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	7.20
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	8.35
Tin Plate (1.50 lb)box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.85

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$91.50
Wire rods, $\frac{7}{32}$-⅜" Pitts. ...	6.40	6.40	6.40	6.40	5.80

PIG IRON, Gross Ton	Aug. 30 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$63.50
Basic, Valley	66.00	66.00	66.00	66.00	62.50
Basic, deld., Philadelphia ..	70.18	70.18	70.18	70.41	66.26
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, deld., Phila. ..	70.68	70.68	70.68	70.91	66.76
No. 2 Fdry, Birmingham ..	62.50	62.50	62.50	62.50	59.00
No. 2 Fdry(Birm.), deld., Cin.	70.20	70.20	70.20	70.20	66.70
Malleable, Valley	66.50	66.50	66.50	66.50	63.00
Malleable, Chicago	66.50	66.50	66.50	66.50	63.00
Ferromanganese, net ton†..	245.00	245.00	245.00	245.00	215.00

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†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$35.50	$35.50	$35.50	$31.50	$58.50
No. 1 Heavy Melt, E. Pa. ..	40.00	40.00	40.00	35.00	59.00
No. 1 Heavy Melt, Chicago .	40.50	39.50	38.00	31.50	50.00
No. 1 Heavy Melt, Valley ..	39.50	39.50	38.50	33.50	64.50
No. 1 Heavy Melt, Cleve. ..	36.50	36.50	35.50	31.50	62.00
No. 1 Heavy Melt, Buffalo .	31.50	31.50	31.50	29.50	56.50
Rails, Rerolling, Chicago ...	60.50	59.50	58.50	53.50	84.50
No. 1 Cast, Chicago	42.50	42.50	42.50	41.50	53.50

COKE, Net Ton

Beehive, Furn., Connlsvl. ..	$16.00	$15.00	$15.00	$15.00	$14.50
Beehive, Fdry., Connlsvl. ..	18.25	18.25	18.25	18.25	17.50
Owen, Fdry., Milwaukee ...	32.00	32.00	32.00	32.00	29.50

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Tel: 1-0463 Cable Address: YAWATASTEEL DUESSELDORF

American Office: Rm. 2009, Seagram Bldg., 375 Park Ave., New York, 22, N.Y., U.S.A. Tel: Murray Hill 8-3327
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Steel Prices

Mill base prices as reported to STEEL, Aug. 30, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 130; footnotes, page 132.

SEMIFINISHED

INGOTS, Carbon Forging (NT)

Munhall,Pa. U5	$76.00

INGOT, Alloy (NT)

Detroit S41	$82.00
Economy,Pa. B14	82.00
Farrell,Pa. S3	82.00
Lowellville,O. S3	82.00
Midland,Pa. C18	82.00
Munhall,Pa. U5	82.00
Sharon,Pa. S3	82.00

BILLETS, BLOOMS & SLABS Carbon Rolling (NT)

Bartonville,Ill. K4	$82.00
Bessemer,Pa. U5	80.00
Buffalo R2	80.00
Clairton,Pa. U5	80.00
Ensley,Ala. T2	80.00
Fairfield,Ala. T2	80.00
Fontana,Calif. K1	90.50
Gary,Ind. U5	80.00
Johnstown,Pa. B2	80.00
Lackawanna,N.Y. B2	80.00
Munhall,Pa. U5	80.00
Owensboro,Ky. G8	80.00
S.Chicago,Ill. R2, U5	80.00
S.Duquesne,Pa. U5	80.00
Sterling,Ill. N15	80.00
Youngstown R2	80.00

Carbon, Forging (NT)

Bessemer,Pa. U5	$99.50
Buffalo R2	99.50
Canton,O. R2	102.00
Clairton,Pa. U5	99.50
Conshohocken,Pa. A3	99.50
Ensley,Ala. T2	99.50
Fairfield,Ala. T2	99.50
Farrell,Pa. S3	99.50
Fontana,Calif. K1	109.00
Gary,Ind. U5	99.50
Geneva,Utah C11	99.50
Houston S5	104.50
Johnstown,Pa. B2	99.50
Lackawanna,N.Y. B2	99.50
LosAngeles B3	109.00
Midland,Pa. C18	99.50
Munhall,Pa. U5	99.50
Owensboro,Ky. C8	99.50
Seattle B3	109.00
Sharon,Pa. S3	99.50
S.Chicago R2, U5, W14	99.50
S.Duquesne,Pa. U5	99.50
S.SanFrancisco B3	109.00
Warren,O. C17	99.50

Alloy, Forging (NT)

Bethlehem,Pa. B2	$119.00
Bridgeport,Conn. C32	119.00
Buffalo R2	119.00
Canton,O. R2, T7	119.00
Conshohocken,Pa. A3	121.00
Detroit S41	119.00
Economy,Pa. B14	119.00
Farrell,Pa. S3	119.00
Fontana,Calif. K1	140.00
Gary,Ind. U5	119.00
Houston S5	124.00
Ind.Harbor,Ind. Y1	119.00
Johnstown,Pa. B2	119.00
Lackawanna,N.Y. B2	119.00
LosAngeles B3	139.00
Lowellville,O. S3	119.00
Massillon,O. R2	119.00
Midland,Pa. C18	119.00
Munhall,Pa. U5	119.00
Owensboro,Ky. G8	119.00
Seattle(6) B3	140.00
Sharon,Pa. S3	119.00
S.Chicago R2,U5,W14	119.00
S.Duquesne,Pa. U5	119.00
Struthers,O. Y1	119.00
Warren,O. C17	119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2	$122.50
Canton,O. R2	125.00
Cleveland R2	122.50
Gary,Ind. U5	122.50
S.Chicago,Ill. R2,W14	122.50
S.Duquesne,Pa. U5	122.50
Warren,O. C17	122.50

SKELP

Aliquippa,Pa. J5	5.05
Benwood,W.Va. W10	5.05
Ind.Harbor,Ind. Y1	5.05
Munhall,Pa. P5	5.05
Pittsburgh J5	5.05
Warren,O. R2	5.05
Youngstown R2, U5	5.05

WIRE RODS

AlabamaCity,Ala. R2	6.40
Aliquippa,Pa. J5	6.40
Alton,Ill. L1	6.60
Bartonville,Ill. K4	6.50
Buffalo W12	6.40
Cleveland A7	6.40
Donora,Pa. A7	6.40
Fairfield,Ala. T2	6.40
Houston S5	6.65
IndianaHarbor,Ind. Y1	6.40
Johnstown,Pa. B2	6.40
Joliet,Ill. A7	6.40
KansasCity,Mo. S5	6.65
Kokomo,Ind. C16	6.50
LosAngeles B3	7.20
Minnequa,Colo. C10	6.65
Monessen,Pa. P7	6.40
N.Tonawanda S47	6.40
Pittsburg,Calif. C11	7.20
Portsmouth,O. P12	6.40
Roebling,N.J. R5	6.50
S.Chicago,Ill. R2. W14	6.40
SparrowsPoint,Md. B2	6.50
Sterling,Ill.(1) N15	6.40
Sterling,Ill. N15	6.50
Struthers,O. Y1	6.40
Worcester,Mass. A7	6.70

STRUCTURALS

Carbon Steel Std. Shapes

AlabamaCity,Ala. R2	5.50
Aliquippa,Pa. J5	5.50
Atlanta A11	5.70
Bessemer,Ala. T2	5.50
Bethlehem,Pa. B2	5.55
Birmingham C15	5.50
Clairton,Pa. U5	5.50
Fairfield,Ala. T2	5.50
Fontana,Calif. K1	6.30
Gary,Ind. U5	5.50
Geneva,Utah C11	5.50
Houston S5	5.60
Ind.Harbor,Ind. I-2, Y1	5.50
Johnstown,Pa. B2	5.55
Joliet,Ill. P22	5.50
KansasCity,Mo. S5	5.60
Lackawanna,N.Y. B2	5.55
LosAngeles B3	6.20
Minnequa,Colo. C10	5.80
Munhall,Pa. U5	5.50
Niles,Calif. P1	6.25
Phoenixville,Pa. P4	5.55
Portland,Oreg. O4	6.25
Seattle B3	6.25
S.Chicago,Ill. U5, W14	5.50
S.SanFrancisco B3	6.15
Sterling,Ill. N15	5.50
Struthers,O. Y1	5.50
Torrance,Calif. C11	6.20
Weirton,W.Va. W6	5.50

Wide Flange

Bethlehem,Pa. B2	5.55
Clairton,Pa. U5	5.50
Fontana,Calif. K1	6.45
IndianaHarbor,Ind. I-2	5.50
Lackawanna,N.Y. B2	5.55
Munhall,Pa. U5	5.50
Phoenixville,Pa. P4	5.55
S.Chicago,Ill. U5	5.50
Sterling,Ill. N5	5.50
Weirton,W.Va. W6	5.50

Alloy Std. Shapes

Aliquippa,Pa. J5	6.80
Clairton,Pa. U5	6.80
Gary,Ind. U5	6.80
Houston S5	6.90
Munhall,Pa. U5	6.80
S.Chicago,Ill. U5, W14	6.80

H.S., L.A., Std. Shapes

Aliquippa,Pa. J5	8.05
Bessemer,Ala. T2	8.05
Bethlehem,Pa. B2	8.10
Clairton,Pa. U5	8.05
Fairfield,Ala. T2	8.05
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.05
Geneva,Utah C11	8.05
Houston S5	8.15
Ind.Harbor,Ind. I-2, Y1	8.05
Johnstown,Pa. B2	8.10
KansasCity,Mo. S5	8.15
Lackawanna,N.Y. B2	8.10
LosAngeles B3	8.75
Munhall,Pa. U5	8.05
Phoenixville,Pa. P4	8.10
Seattle B3	8.80
S.Chicago,Ill. U5, W14	8.05
S.SanFrancisco B3	8.70
Sterling,Ill. N15	7.75
Struthers,O. Y1	8.05

H.S., L.A., Wide Flange

Bethlehem,Pa. B2	8.10
Ind.Harbor,Ind. I-2	8.05
Lackawanna,N.Y. B2	8.10
Munhall,Pa. U5	8.05
S.Chicago,Ill. U5	8.05
Sterling,Ill. N15	7.75

PILING

BEARING PILES

Bethlehem,Pa. B2	5.55
Ind.Harbor,Ind. I-2	5.50
Lackawanna,N.Y. B2	5.55
Munhall,Pa. U5	5.50
S.Chicago,Ill. I-2, U5	5.50

STEEL SHEET PILING

Ind.Harbor,Ind. I-2	6.50
Lackawanna,N.Y. B2	6.50
Munhall,Pa. U5	6.50
S.Chicago,Ill. I-2, U5	6.50
Weirton,W.Va. W6	6.50

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2	5.30
Aliquippa,Pa. J5	5.30
Ashland,Ky.(15) A10	5.30
Bessemer,Ala. T2	5.30
Clairton,Pa. U5	5.30
Claymont,Del. P4	5.30
Cleveland J5, R2	5.30
Coatesville,Pa. L7	5.30
Conshohocken,Pa. A3	5.30
Ecorse,Mich. G5	5.30
Fairfield,Ala. T2	5.30
Farrell,Pa. S3	5.30
Fontana,Calif.(30) K1	6.10
Gary,Ind. U5	5.30
Geneva,Utah C11	5.30
GraniteCity,Ill. G4	5.40
Houston S5	5.40
Ind.Harbor,Ind. I-2, Y1	5.30
Johnstown,Pa. B2	5.30
Lackawanna,N.Y. B2	5.30
Mansfield,O. E6	5.30
Minnequa,Colo. C10	6.15
Munhall,Pa. U5	5.30
Newport,Ky. A2	5.30
Pittsburgh J5	5.30
Riverdale,Ill. A1	5.30
Seattle B2	6.20
Sharon,Pa. S3	5.30
S.Chicago,Ill. U5, W14	5.30
SparrowsPoint,Md. B2	5.30
Sterling,Ill. N15	5.30
Steubenville,O. W10	5.30
Warren,O. R2	5.30
Youngstown U5, Y1	5.30
Youngstown(27) R2	5.30

PLATES, Carbon Abras. Resist.

Claymont,Del. P4	7.05
Fontana,Calif. K1	7.85
Geneva,Utah C11	7.05
Houston S5	7.15
Johnstown,Pa. B2	7.05
SparrowsPoint,Md. B2	7.05

PLATES, Wrought Iron

Economy,Pa. B14	14.10

PLATES, H.S., L.A.

Aliquippa,Pa. J5	7.95
Ashland,Ky. A10	7.95
Bessemer,Ala. T2	7.95
Clairton,Pa. U5	7.95
Claymont,Del. P4	7.95
Cleveland J5, R2	7.95
Coatesville,Pa. L7	7.95
Conshohocken,Pa. A3	7.95
Economy,Pa. B14	7.95
Ecorse,Mich. G5	7.95
Fairfield,Ala. T2	7.95
Farrell,Pa. S3	7.95
Fontana,Calif.(30) K1	8.75
Gary,Ind. U5	7.95
Geneva,Utah C11	7.95
Houston S5	8.05
Ind.Harbor,Ind. I-2, Y1	7.95
Johnstown,Pa. B2	7.95
Munhall,Pa. U5	7.95
Pittsburgh J5	7.95
Seattle B3	8.85
Sharon,Pa. S3	7.95
S.Chicago,Ill. U5, W14	7.95
SparrowsPoint,Md. B2	7.95
Sterling,Ill. N15	7.625
Warren,O. R2	7.95
Youngstown U5, Y1	7.95

PLATES, Alloy

Claymont,Del. P4	7.50
Coatesville,Pa. L7	7.50
Economy,Pa. B14	7.50
Farrell,Pa. S3	7.50
Fontana,Calif. K1	8.30
Gary,Ind. U5	7.50
Houston S5	7.60
Ind.Harbor,Ind. Y1	7.50
Johnstown,Pa. B2	7.50
Lowellville,O. S3	7.50
Munhall,Pa. U5	7.50
Newport,Ky. A2	7.50
Pittsburgh J5	7.50
Seattle B3	8.40
Sharon,Pa. S3	7.50
S.Chicago,Ill. U5, W14	7.50
SparrowsPoint,Md. B2	7.50
Youngstown Y1	7.50

PLATES, Ingot Iron

Ashland c.l. (15) A10	5.55
Ashland l.c.l.(15) A10	6.05
Cleveland c.l. R22	6.05
Warren,O. R2	6.05

FLOOR PLATES

Cleveland J5	6.375
Claymont,Del. P4	6.375
Conshohocken,Pa. A3	6.375
Ind.Harbor,Ind. I-2	6.375
Munhall,Pa. U5	6.375
Pittsburgh J5	6.375
S.Chicago,Ill. U5	6.375

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2	5.675
Aliquippa,Pa.(9) J5	5.675
Alton,Ill. L1	5.875
Atlanta(9) A11	5.875
Bessemer,Ala.(9) T2	5.675
Birmingham(9) C15	5.675
Buffalo(9) R2	5.675
Canton,O.(23) R2	6.15
Clairton,Pa.(9) U5	5.675
Cleveland(9) R2	5.675
Ecorse,Mich.(9) G5	5.675
Emeryville,Calif. J7	6.425
Fairfield,Ala.(9) T2	5.675
Fairless,Pa.(9) U5	5.825
Fontana,Calif.(9) K1	6.375
Gary,Ind.(9) U5	5.675
Houston(9) S5	5.925
Ind.Harbor(9) I-2, Y1	5.675
Johnstown,Pa.(9) B2	5.675
Joliet,Ill. P2	5.675
KansasCity,Mo.(9) S5	5.925
Lackawanna(9) B2	5.675
LosAngeles(9) B3	6.375
Massillon,O.(23) R2	6.15
Midland,Pa.(23) C18	6.025
Milton,Pa. M18	5.825
Minnequa,Colo. C10	6.125
Niles,Calif. P1	6.375
N.Tonawanda S47	5.675
Owensboro,Ky.(9) G8	6.025
Pittsburg,Calif.(9) C11	6.375
Pittsburgh(9) J5	5.675
Portland,Oreg. O4	6.425
Riverdale,Ill.(9) A1	5.675
Seattle(9) A24,B3,N15	6.425
S.Ch'c'go(9)R2,U5,W14	5.675
S.Duquesne,Pa.(9) U5	5.675
S.SanFran.,Calif.(9) B3	6.425
Sterling,Ill.(1)(9) N15	5.675
Sterling,Ill.(9) N15	5.775
Struthers,O.(9) Y1	5.675
Tonawanda,N.Y. B12	5.675
Torrance,Calif.(9) C11	6.375
Warren,O. C17	6.025
Youngstown(9) R2, U5	5.675

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5	6.725
Bethlehem,Pa. B2	6.725
Bridgeport,Conn. C32	6.80
Buffalo R2	6.725
Canton,O. R2, T7	6.725
Clairton,Pa. U5	6.725
Detroit S41	6.725
Economy,Pa. B14	6.725
Ecorse,Mich. G5	6.725
Farrell,Pa. S3	6.725
Fontana,Calif. K1	7.775
Gary,Ind. U5	6.725
Houston S5	6.975
Ind.Harbor,Ind. I-2, Y1	6.725
Johnstown,Pa. B2	6.725
KansasCity,Mo. S5	6.975
Lackawanna,N.Y. B2	6.725
LosAngeles B3	7.775
Lowellville,O. S3	6.725
Massillon,O. R2	6.725
Midland,Pa. C18	6.725
N.Tonawanda S47	6.725
Owensboro,Ky. G8	6.725
Pittsburgh J5	6.725
Seattle(6) B3	7.825
Sharon,Pa. S3	6.725
S.Chicago R2, U5, W14	6.725
S.Duquesne,Pa. U5	6.725
Struthers,O. Y1	6.725
Warren,O. C17	6.725
Youngstown U5	6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy

Aliquippa,Pa. J5	8.30
Bessemer,Ala. T2	8.30
Bethlehem,Pa. B2	8.30
Clairton,Pa. U5	8.30
Cleveland R2	8.30
Ecorse,Mich. G5	8.30
Fairfield,Ala. T2	8.30
Fontana,Calif. K1	9.00
Gary,Ind. U5	8.30
Houston S5	8.55
Ind.Harbor,Ind. Y1	8.30
Johnstown,Pa. B2	8.30
KansasCity,Mo. S5	8.55
Lackawanna,N.Y. B2	8.30
LosAngeles B3	9.00
Pittsburgh J5	8.30
Seattle B3	9.05
S.Chicago,Ill. R2, W14	8.30
S.Duquesne,Pa. U5	8.30
S.SanFrancisco B3	9.05
Sterling,Ill. N15	7.925
Struthers,O. Y1	8.30
Youngstown U5	8.30

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2	5.825
Houston(9) S5	5.925
KansasCity,Mo.(9) S5	5.925
Lackawanna(9) B2	5.675
Sterling,Ill. N15	5.775
Sterling,Ill.(1) N15	5.675
Tonawanda,N.Y. B12	5.675

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5	5.675
Atlanta A11	5.875
Joliet,Ill. P22	5.675
Minnequa,Colo. C10	6.125
Niles,Calif. P1	6.375
Pittsburgh J5	5.675
Portland,Oreg. O4	6.425
SanFrancisco S7	6.52
Seattle B3	6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron

Economy,Pa. B14	16.45

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5	6.80
Clairton,Pa. U5	6.80
Gary,Ind. U5	6.80
Houston S5	7.05
KansasCity,Mo. S5	7.05
Pittsburgh J5	6.80
Youngstown U5	6.80

BARS, C.F. Leaded (Including leaded extra)

Carbon

LosAngeles P2, S30	11.75*

Alloy

Ambridge,Pa. W18	10.175
BeaverFalls,Pa. M12	10.175
Camden,N.J. P13	10.35
Chicago W18	10.175
Elyria,O. W8	10.175
Monaca,Pa. S17	10.175
Newark,N.J. W18	10.35
SpringCity,Pa. K3	10.35

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*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon

Ambridge,Pa. W18	7.65
BeaverFalls,Pa. M12,R2	7.65
Birmingham C15	8.10
Buffalo B5	7.70
Camden,N.J. P13	8.10
Carnegie,Pa. C12	7.65
Chicago W18	7.65
Cleveland A7, C20	7.65
Detroit B5, H5, P17	7.85
Detroit S41	7.65
Donora,Pa. A7	7.65
Elyria,O. W8	7.65
FranklinPark,Ill. N5	7.65
Gary,Ind. R2	7.65
GreenBay,Wis. F7	7.65
Hammond,Ind. J5, L2	7.65
Hartford,Conn. R2	8.15
Harvey,Ill. B5	7.65
LosAngeles(49) S30	9.10
LosAngeles(49) P2, R2	9.10
Mansfield,Mass. B5	8.20
Massillon,O. R2, R8	7.65
Midland,Pa. C18	7.65
Monaca,Pa. S17	7.16
Newark,N.J. W18	8.10
NewCastle,Pa.(17) B4	7.65
Pittsburgh J5	7.65
Plymouth,Mich. P5	7.90
Putnam,Conn. W18	8.20
Readville,Mass. C14	8.20
Seattle(49) S30	9.10
S.Chicago,Ill. W14	7.65
SpringCity,Pa. K3	8.10
Struthers,O. Y1	7.65
Warren,O. C17	7.65
Waukegan,Ill. A7	7.65
Willimantic,Conn. J5	8.15
Youngstown F3, Y1	7.65

BARS, Cold-Finished Alloy (Turned and Ground)

Cumberland,Md.(5) C19	6.55

BARS, Cold-Finished Alloy

Ambridge,Pa. W18	9.025
BeaverFalls,Pa. M12,R2	9.025
Bethlehem,Pa. B2	9.025
Bridgeport,Conn. C32	9.175
Buffalo B5	9.025
Camden,N.J. P13	9.20
Canton,O. T7	9.025
Carnegie,Pa. C12	9.025
Chicago W18	9.025
Cleveland A7, C20	9.25
Detroit B5, P17	9.225
Detroit H5, S41	9.025
Donora,Pa. A7	9.025
Elyria,O. W8	9.025
FranklinPark, Ill. N5	9.025
Gary,Ind. R2	9.025
GreenBay,Wis. F7	9.025

Hammond,Ind. J5, L2	9.025
Hartford,Conn. R2	9.325
Harvey,Ill. R5	9.025
Lackawanna,N.Y. B3	9.025
LosAngeles P2, S30	11.00
Mansfield,Mass. B5	9.325
Massillon,O. R2, R8	9.025
Midland,Pa. C18	9.025
Monaca,Pa. S17	9.025
Newark,N.J. W18	9.20
N.Tonawanda S47	9.025
Plymouth,Mich. P5	9.225
S.Chicago,Ill. W14	9.025
SpringCity,Pa. K3	9.20
Struthers,O. Y1	9.025
Warren,O. C17	9.025
Waukegan,Ill. A7	9.025
Willimantic,Conn. J5	9.325
Worcester,Mass. A7	9.325
Youngstown F3, Y1	9.025

BARS, Reinforcing, Billet (To Fabricators)

Atlanta A11	5.00
Birmingham C15	5.25
Ecorse,Mich. G5	5.675
Emeryville,Calif. J7	6.425
Fontana,Calif. K1	6.375
Ind.Harbor,Ind. Y1	5.675
Johnstown,Pa. B2	5.675
Joliet,Ill. P22	5.675
Kokomo,Ind. C16	5.775
Lackawanna,N.Y. B2	5.675
LosAngeles B3	6.375
Madison,Ill. L1	5.475
Milton,Pa. M18	5.825
Minnequa,Colo. C10	6.125
Niles,Calif. P1	6.375
Pittsburgh J5	5.675
Portland,Oreg. O4	6.425
Seattle A24, B3, N14	6.425
S.Chicago,Ill. W14	5.675
S.SanFrancisco B3	6.425
SparrowsPoint,Md. B2	5.675
Steelton,Pa. B2	5.675
Sterling,Ill. (1) N15	5.675
Sterling,Ill. N15	5.775
Struthers,O. Y1	5.675
Tonawanda,N.Y. B12	6.10

BARS, Reinforcing, Billet (Fabricated, to Consumers)

Baltimore B2	7.42
Boston B2, U8	8.15
Chicago U8	7.41
Cleveland U8	7.39
Johnstown,Pa. B2	7.33
Lackawanna,N.Y. B2	7.35
Marion,O. P11	6.70
Newark,N.J. U8	7.80
Philadelphia U8	7.63
Pittsburgh J5, U8	7.35
Seattle A24, B3, N14	7.95
SparrowsPoint,Md. B2	7.33
St.Paul U8	8.17

BARS, Wrought Iron

Economy,Pa.(S.R.)B14	16.10
Economy,Pa.(D.R.)B14	20.50
Econ.(DirectRolled)B14	13.55
Economy(Staybolt)B14	20.50
McK.Rks.(S.R.) L5	16.10
McK.Rks.(D.R.) L5	20.50
McK.Rks.(DirRolled)L5	13.55

BARS, Rail Steel

ChicagoHts.(3) C2, I-2	5.575
ChicagoHts.(4)(44) I-2	5.675
ChicagoHts.(4) C2	5.675
Franklin,Pa.(3) F5	5.575
Franklin,Pa.(4) F5	5.675
JerseyShore,Pa.(3) J8	5.55
Marion,O.(3) P11	5.575
Tonawanda(3) B12	5.575
Tonawanda(4) B12	6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2	5.10
Allenport,Pa. P7	5.10
Aliquippa,Pa. J5	5.10
Ashland,Ky.(8) A10	5.10
Cleveland J5, R2	5.10
Conshohocken,Pa. A3	5.15
Detroit(8) M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Fairless,Pa. U5	5.15
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Geneva,Utah C11	5.20
GraniteCity,Ill.(8) G4	5.20
Ind.Harbor,Ind. I-2, Y1	5.10
Irvin,Pa. U5	5.10
Lackawanna,N.Y. B2	5.10
Mansfield,O. E6	5.10
Munhall,Pa. U5	5.10
Newport,Ky. A2	5.10
Niles,O. M21, S3	5.10
Pittsburg,Calif. C11	5.80
Pittsburgh J5	5.10
Portsmouth,O. P12	5.10
Riverdale,Ill. A1	5.10
Sharon,Pa. S3	5.10
S.Chicago,Ill. U5, W14	5.10
SparrowsPoint,Md. B2	5.10
Steubenville,O. W10	5.10
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5, Y1	5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3	6.275

SHEETS, H.R. Alloy

Gary,Ind. U5	8.40
Ind.Harbor,Ind. Y1	8.40
Irvin,Pa. U5	8.40
Munhall,Pa. U5	8.40
Newport,Ky. A2	8.40
Youngstown U5, Y1	8.40

SHEETS, H.R.(14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5	7.525
Ashland,Ky. A10	7.525
Cleveland J5, R2	7.525
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.525
Fairfield,Ala. T2	7.525
Fairless,Pa. U5	7.575
Farrell,Pa. S3	7.525
Fontana,Calif. K1	8.25
Gary,Ind. U5	7.525
Ind.Harbor,Ind. I-2, Y1	7.525
Irvin,Pa. U5	7.525
Lackawanna(35) B2	7.525
Munhall,Pa. U5	7.525
Niles,O. S3	7.525
Pittsburgh J5	7.525
S.Chicago,Ill. U5, W14	7.525
Sharon,Pa. S3	7.525
SparrowsPoint(36) B2	7.525
Warren,O. R2	7.525
Weirton,W.Va. W6	7.525
Youngstown U5, Y1	7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10	5.35
Cleveland R2	5.875
Warren,O. R2	5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	7.05
Middletown,O. A10	6.775
Warren,O. R2	7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2	6.275
Aliquippa,Pa. J5	6.275
Allenport,Pa. P7	6.275
Cleveland J5, R2	6.275
Conshohocken,Pa. A3	6.325
Detroit M1	6.275
Ecorse,Mich. G5	6.275
Fairfield,Ala. T2	6.275
Fairless,Pa. U5	6.325
Follansbee,W.Va. F4	6.275
Fontana,Calif. K1	7.40
Gary,Ind. U5	6.275
GraniteCity,Ill. G4	6.375
Ind.Harbor,Ind. I-2, Y1	6.275
Irvin,Pa. U5	6.275
Lackawanna,N.Y. B2	6.275
Mansfield,O. E6	6.275
Middletown,O. A10	6.275
Newport,Ky. A2	6.275
Pittsburg,Calif. C11	7.225
Pittsburgh J5	6.275
Portsmouth,O. P12	6.275
SparrowsPoint,Md. B2	6.275
Steubenville,O. W10	6.275
Warren,O. R2	6.275
Weirton,W.Va. W6	6.275
Yorkville,O. W10	6.275
Youngstown Y1	6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5	9.275
Cleveland J5, R2	9.275
Ecorse,Mich. G5	9.275
Fairless,Pa. U5	9.325
Fontana,Calif. K1	10.40
Gary,Ind. U5	9.275
Ind.Harbor,Ind. I-2, Y1	9.275
Lackawanna(38) B2	9.275
Pittsburgh J5	9.275
SparrowsPoint(33) B2	9.275
Warren,O. R2	9.275
Weirton,W.Va. W6	9.275
Youngstown Y1	9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.125	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.125	....
Fairfield,Ala. T2	7.125	7.375
Gary,Ind. U5	7.125	7.375
GraniteCity,Ill.G4	7.225	....
Ind.Harbor I-2	7.225	7.425
Irvin,Pa. U5	7.125	7.375
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.125	7.375
Pitts.,Calif. C11	7.875	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....
Weirton W6	7.125	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2	7.475

SHEETS, Enameling

Ashland,Ky. A10	6.775
Cleveland R2	6.775
Fairfield,Ala. T2	6.775
Gary,Ind. U5	6.775
Ind.Harbor,Ind. I-2, Y1	6.775
Irvin,Pa. U5	6.775
Middletown,O. A10	6.775
Niles,O. M21, S3	6.775
SparrowsPoint,Md. B2	6.775
Youngstown Y1	6.775

BLUED STOCK, 29 Gage

Dover,O. E6	8.70
Ind.Harbor,Ind. I-2	8.70
Mansfield,O. E6	8.70
Warren,O. R2	8.70
Yorkville,O. W10	8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10	7.225
Gary,Ind. U5	7.225
Mansfield,O. E6	7.225
Middletown,O. A10	7.225
Niles,O. M21, S3	7.225
Warren,O. R2	7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1)	9.525
Butler,Pa. A10 (type 2)	9.625
Irvin,Pa. U5 (type 1)	9.525

SHEETS, Well Casing

Fontana,Calif. K1	7.325
Geneva,Utah C11	6.80

SHEETS, Galvanized High-Strength, Low Alloy

Irvin,Pa. U5	10.125
Pittsburgh J5	10.125
SparrowsPt.(39) B2	10.025

SHEETS, Galvannealed Steel

Canton,O. R2	7.175
Irvin,Pa. U5	7.175

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10	7.125
Middletown,O. A10	7.125

SHEETS, Electrogalvanized

Canfield,O. C3	7.50
Cleveland (28) R2	7.65
Niles,O. (28) R2	7.65
Weirton,W.Va. W6	7.50

SHEETS, Galvanized Steel Hot-Dipped§

AlabamaCity,Ala. R2	6.875‡
Ashland,Ky. A10	6.875‡
Canton,O. R2	6.875‡
Dover,O. E6	6.875†
Fairfield,Ala. T2	6.875†
Gary,Ind. U5	6.875†
GraniteCity,Ill. G4	6.975*
Ind.H'rb'r,Ind. I-2, Y1	6.875†
Irvin,Pa. U5	6.875†
Kokomo,Ind. C16	6.975‡
MartinsFerry,O. W10	6.875*
Middletown,O. A10	6.875†
Pittsburg,Calif. C11	7.625*
Pittsburgh J5	6.875†
SparrowsPt.,Md. B2	6.875†
Warren,O. R2	6.875†
Weirton,W.Va. W6	6.875*

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*Continuous and noncontinuous. †Continuous. ‡Noncontinuous. §For minimum spangled add 0.15c.

Key to Producers

A1	Acme Steel Co.
A2	Acme-Newport Steel Co.
A3	Alan Wood Steel Co.
A4	Allegheny Ludlum Steel
A5	Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6	American Shim Steel Co.
A7	American Steel & Wire Div., U. S. Steel Corp.
A8	Anchor Drawn Steel Co.
A9	Angell Nail & Chaplet
A10	Armco Steel Corp.
A11	Atlantic Steel Co.
A25	Algoma Steel Corp. Ltd.
B1	Babcock & Wilcox
B2	Bethlehem Steel Co.
B3	Bethlehem Steel Co., Pacific Coast Div.
B4	Blair Strip Steel Co.
B5	Bliss & Laughlin Inc.
B8	Braeburn Alloy Steel
B9	Brainard Steel Div., Sharon Steel Corp.
B10	E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12	Buffalo Steel Corp.
B14	A. M. Byers Co.
B15	J. Bishop & Co.
C1	Calstrip Steel Corp.
C2	Calumet Steel Div., Borg-Warner Corp.
C3	Canfield Steel Co.
C4	Carpenter Steel Co.
C9	Colonial Steel Co.
C10	Colorado Fuel & Iron
C11	Columbia-Geneva Steel
C12	Columbia Steel & Shaft.
C13	Columbia Tool Steel Co.
C14	Compressed Steel Shaft.
C15	Connors Steel Div., H. K. Porter Co., Inc.
C16	Continental Steel Corp.
C17	Copperweld Steel Co.
C18	Crucible Steel Co.
C19	Cumberland Steel Co.
C20	Cuyahoga Steel & Wire Div., Hoover Ball & Bearing
C23	Charter Wire Inc.
C24	G. O. Carlson Inc.
C32	Carpenter Steel ofN.Eng.
D2	Detroit Steel Corp.
D4	Disston Div., H. K. Porter Co. Inc.
D6	Driver-Harris Co.
D7	Dickson Weatherproof Nail Co.
D8	Damascus Tube Co.
D9	Wilbur B. Driver Co.
E2	Eastern Stainless Steel
E6	Empire-Reeves Steel
E10	Enamel Prod. & Plating
F2	Firth Sterling Inc.
F3	Fitzsimons Steel Co.
F5	Franklin Steel Div., Borg-Warner Corp.
F6	Fretz-Moon Tube Co.
F7	Ft. Howard Steel & Wire
F8	Ft. Wayne Metals Inc.
G4	Granite City Steel Co.
G5	Great Lakes Steel Corp.
G6	Greer Steel Co.
G8	Green River Steel Corp.
H1	Hanna Furnace Corp.
H5	Hercules Drawn Steel
H7	Helical Tube Co.
I-1	Igoe Bros. Inc.
I-2	Inland Steel Co.
I-3	Interlake Iron Corp.
I-4	Ingersoll Steel Div., Borg-Warner Corp.
I-6	Ivins Steel Tube Works
I-7	Indiana Steel & Wire Co.
J1	Jackson Iron & Steel Co.
J3	Jessop Steel Co.
J4	Johnson Steel & Wire Co.
J5	Jones & Laughlin Steel
J6	Joslyn Mfg. & Supply
J7	Judson Steel Corp.
J8	Jersey Shore Steel Co.
J10	Jay Steel Corp.
K1	Kaiser Steel Corp.
K2	Keokuk Electro-Metals
K3	Keystone Drawn Steel
K4	Keystone Steel & Wire
L1	Laclede Steel Co.
L2	LaSalle Steel Co.
L3	Latrobe Steel Co.
L5	Lockhart Iron & Steel
L6	Lone Star Steel Co.
L7	Lukens Steel Co.
L8	Leschen Wire Rope Div., H. K. Porter Co. Inc.
M-1	McLouth Steel Corp.
M4	Mahoning Valley Steel
M6	Mercer Pipe Div., Sawhill Tubular Products
M8	Mid-States Steel & Wire
M12	Moltrup Steel Products
M14	McInnes Steel Co.
M16	Md. Fine & Specialty Wire Co. Inc.
M17	Metal Forming Corp.
M18	Milton Steel Div., Merritt-Chapman&Scott
M21	Mallory-Sharon Metals Corp.
M22	Mill Strip Products Co.
M23	Mill Strip Products Co. of Pennsylvania
N1	National Standard Co.
N2	National Supply, Armco Steel Corp.
N3	National Tube Div., U. S. Steel Corp.
N5	Nelsen Steel & Wire Co.
N6	New England High Carbon Wire Co.
N8	Newman-Crosby Steel
N14	Northwest. Steel Rolling Mills Inc.
N15	Northwestern S.&W. Co.
N17	National Steel Corp.
N20	Neville Ferro Alloy Co.
O1	Ohio Ferro-Alloys Corp.
O4	Oregon Steel Mills
P1	Pacific States Steel Corp.
P2	Pacific Tube Co.
P4	Phoenix Steel Corp.
P5	Pilgrim Drawn Steel
P6	Pittsburgh Coke & Chem.
P7	Pittsburgh Steel Co.
P11	Pollak Steel Co.
P12	Portsmouth Div., Detroit Steel Corp.
P13	Precision Drawn Steel
P15	Pittsburgh Metallurgical
P16	Page Steel & Wire Div., American Chain & Cable
P17	Plymouth Steel Corp.
P19	Pitts. Rolling Mills
P20	Prod. Steel Strip Corp.
P22	Phoenix Mfg. Co.
P25	Phil. Steel & Wire Corp.
R2	Republic Steel Corp.
R5	Roebling's Sons, John A.
R6	Rome Strip Steel Co.
R8	Reliance Div., Eaton Mfg.
R9	Rome Mfg. Co.
R10	Rodney Metals Inc.
S1	Seneca Wire & Mfg. Co.
S3	Sharon Steel Corp.
S4	Sharon Tube Co.
S5	Sheffield Div. Armco Steel Corp.
S6	Shenango Furnace Co.
S7	Simmons Co.
S8	Simonds Saw & Steel Co.
S12	Spencer Wire Corp.
S13	Standard Forgings Corp.
S14	Standard Tube Co.
S15	Stanley Works
S17	Superior Drawn Steel Co.
S18	Superior Steel Div., Copperweld Steel Co.
S19	Sweet's Steel Co.
S20	Southern States Steel
S23	Superior Tube Co.
S25	Stainless Welded Prod.
S26	Specialty Wire Co. Inc.
S30	Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S31	Sawhill Tubular Products
S40	Seneca Steel Service
S41	Stainless & Strip Div., J & L Steel Corp.
S42	Southern Elec. Steel Co.
S43	Seymour Mfg. Co.
S44	Screw & Bolt Corp. of America
S45	Somers Brass Co.
S46	Steel Co. of Canada
S47	Seaway Steel Corp.
T2	Tenn. Coal & Iron Div. U. S. Steel Corp.
T3	Tenn. Products & Chemical
T4	Texas Steel Co.
T5	Thomas Strip Div., Pittsburgh Steel Co.
T6	Thompson Wire Co.
T7	Timken Roller Bearing
T9	Tonawanda Iron Div., Am. Rad. & Stan. San.
T13	Tube Methods Inc.
T19	Techalloy Co. Inc.
U3	Union Wire Rope, Armco Steel Corp.
U4	Universal-Cyclops Steel
U5	U. S. Steel Corp.
U6	U. S. Pipe & Foundry
U7	Ulbrich Stainless Steels
U8	U. S. Steel Supply Div., U. S. Steel Corp.
U11	Union Carbide Metals Co.
U13	Union Steel Corp.
V2	Vanadium-Alloy Steel
V3	Vulcan-Kidd Steel Div., H. K. Porter Co.
W1	Wallace Barnes Steel Div., Associated Spring
W2	Wallingford Steel Co.
W3	Washburn Wire Co.
W4	Washington Steel Corp.
W6	Weirton Steel Div., National Steel Corp.
W8	Western Automatic Machine Screw Co.
W9	Wheatland Tube Co.
W10	Wheeling Steel Corp.
W12	Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13	Wilson Steel & Wire Co.
W14	Wisconsin Steel Div., International Harvester
W15	Woodward Iron Co.
W18	Wyckoff Steel Co.
Y1	Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago,Ill. W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5, Y1	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.425
Farrell,Pa. S3	7.425
Follansbee,W.Va. W10	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.425
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, M23	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3, N8	7.975
Philadelphia P24	7.875
Riverdale,Ill. A1	7.425
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975
Youngstown Y1	7.425
Youngstown S41	7.425

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie,Pa. S18	15.55
Cleveland A7	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. S18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. S8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80
Weirton,W.Va. W6	10.80
Youngstown Y1	10.80

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

STRIP, C.R., Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
NewCastle,Pa. M23	7.425*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41	7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	8.175

TIGHT COOPERAGE HOOP

Atlanta A11	5.825
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	...	18.85	22.95	27.80
Buffalo W12	...	...	18.85	....	....
Fostoria,O. S1	...	...	19.05	22.15	....
FranklinPark,Ill. T6	...	...	19.20	23.30	28.15
Harrison,N.J. C18	...	...	18.85	22.95	27.80
NewYork W3	...	...	18.85	22.95	27.80
Palmer,Mass. W12	...	...	18.85	....	....
Trenton,N.J. R5	...	...	18.85	22.95	27.80
Worcester,Mass. A7, T6	...	...	18.85	22.95	27.80
Youngstown S41	...	...	19.20	23.30	28.15

TIN MILL PRODUCTS

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Basis Weight			
	45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.10	$6.25	$6.40	$6.55
Fairless,Pa. U5	6.10	6.25	6.40	6.55
Gary,Ind. U5	6.10	6.25	6.40	6.55
IndianaHarbor,Ind. I-2	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint,Md. B2	6.10	6.25	6.40	6.55
Weirton,W.Va. W6	6.10	6.25	6.40	6.55

TIN PLATE, Electrolytic (100 lb basis wt)	0.25 lb Coating
Aliquippa,Pa. J5	$9.10
Fairfield,Ala. T2	9.10
Fairless,Pa. U5	9.10
Fontana,Calif. K1	9.75
Gary,Ind. U5	9.10
GraniteCity,Ill. G4	9.20
Ind.Harb.,Ind. I-2, Y1	9.10
Irvin,Pa. U5	9.10
Niles,O. R2	9.10
Pittsburg,Calif. C11	9.75
SparrowsPt.,Md. B2	9.10
Weirton,W.Va. W6	9.10
Yorkville,O. W10	9.10

ELECTRO. TIN-COATED SHEET (20-27 gage; per 100 lb)

IndianaHarb.,Ind. Y1	$7.90

(21-27 gage; per 100 lb)

Aliquippa,Pa. J5	$7.90
Niles,O. R2	7.90

TIN PLATE, HOT DIPPED COMMON COKE	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.40	10.65
Fairless,Pa. U5	10.40	10.65
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.20
Fairless,Pa. U5	8.20
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING (Black plate) (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Mansfield,O. E6	8.10
Vandergrift,Pa. U5	8.10
Warren,O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths) Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented					
	T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. §Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
N.Tonawanda S47	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00
N.Tonawanda S47	8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa.(10) B2	12.65
KansasCity,Mo. U3	12.90
LosAngeles(2) B3	13.60
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md.(10)B2	12.75
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
Kokomo,Ind. C16	9.85
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.075
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.075
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7	10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.20
Milbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.20
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.20
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Wor'ster,Mass. A7, J4, T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ill. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C16	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

ROPE WIRE	(A)
Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S41	13.45
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville, Ill. K4	17.15
Monessen, Pa. P16	17.15
Roebling, N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson, Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville, Ind. M8	12.35
Dover, O. G6	12.35
Evanston, Ill. M22	12.45
Farrell, Pa. S3	12.35
Fostoria, O. S1	12.35
FranklinPark, Ill. T6	12.45
Kokomo, Ind. C16	12.35
Massillon, O. R8	12.35
Milwaukee C23	12.55
Monessen, Pa. P7, P16	12.35
NewCastle, Pa. M23	12.35
Palmer, Mass. W12	12.65
Pawtucket, R.I. N8	12.65
Philadelphia P24	12.65
Riverdale, Ill. A1	12.45
Rome, N.Y. R6	12.35
Sharon, Pa. S3	12.35
Trenton, N.J. R5	12.65
Warren, O. B9	12.35
Worcester, Mass. A7, T6	12.65

NAILS, Stock Sizes	Col.
AlabamaCity, Ala. R2	173
Aliquippa, Pa. J5	173
Atlanta A11	173
Bartonville, Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville, Ind. M8	175
Donora, Pa. A7	173
Duluth A7	173
Fairfield, Ala. T2	173
Houston S5	178
Jacksonville, Fla. M8	175
Johnstown, Pa. B2	173
Joliet, Ill. A7	173
KansasCity, Mo. S5	178
Kokomo, Ind. C16	175
Minnequa, Colo. C10	178
Monessen, Pa. P7	173
Pittsburg, Calif. C11	192
Rankin, Pa. A7	173
S.Chicago, Ill. R2	173
SparrowsPt., Md. B2	175
Sterling, Ill. (7) N15	175
Worcester, Mass. A7	179

(To Wholesalers: per cwt)

Galveston, Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling, W.Va. W10	$10.10

POLISHED STAPLES	Col.
AlabamaCity, Ala. R2	175
Aliquippa, Pa. J5	173
Atlanta A11	173
Bartonville, Ill. K4	175
Crawfordsville, Ind. M8	177
Donora, Pa. A7	173
Duluth A7	173
Fairfield, Ala. T2	173
Houston S5	180
Jacksonville, Fla. M8	177
Johnstown, Pa. B2	173
Joliet, Ill. A7	173
KansasCity, Mo. S5	180
Kokomo, Ind. C16	177
Minnequa, Colo. C10	178
Pittsburg, Calif. C11	194
Rankin, Pa. A7	173
S.Chicago, Ill. R2	175
SparrowsPt., Md. B2	175
Sterling, Ill. (7) N15	175
Worcester, Mass. A7	179

TIE WIRE, Automatic Baler

(14½ Ga.) (per 97 lb net box)
Coil No. 3150

AlabamaCity, Ala. R2	$8.78
Atlanta A11	10.36
Bartonville, Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville, Ind. M8	8.88
Donora, Pa. A7	8.78
Duluth A7	8.78
Fairfield, Ala. T2	8.78
Houston S5	9.02
Jacksonville, Fla. M8	8.88
Johnstown, Pa. B2	8.78
Joliet, Ill. A7	8.78
KansasCity, Mo. S5	9.02
Kokomo, Ind. C16	8.88
LosAngeles B3	9.20
Minnequa, Colo. C10	8.02
Pittsburg, Calif. C11	9.20
S.Chicago, Ill. R2	8.78
S.SanFrancisco C10	9.20
SparrowsPt., Md. B2	8.88
Sterling, Ill. (37) N15	8.88

Coil No. 6500 Stand.
100 lb coil

AlabamaCity, Ala. R2	$9.06
Atlanta A11	10.70
Bartonville, Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville, Ind. M8	9.16
Donora, Pa. A7	9.06
Duluth A7	9.06
Fairfield, Ala. T2	9.06
Houston S5	9.30
Jacksonville, Fla. M8	9.16
Johnstown, Pa. B2	9.06
Joliet, Ill. A7	9.06
KansasCity, Mo. S5	9.30
Kokomo, Ind. C16	9.16
LosAngeles B3	9.50
Minnequa, Colo. C10	9.30
Pittsburg, Calif. C11	9.50
S.Chicago, Ill. R2	9.06
S.SanFrancisco C10	9.50
SparrowsPt., Md. B2	9.16
Sterling, Ill. (37) N15	9.16

Coil No. 6500 Interim
100 lb coil

AlabamaCity, Ala. R2	$9.11
Atlanta A11	10.75
Bartonville, Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville, Ind. M8	9.21
Donora, Pa. A7	9.11
Duluth A7	9.11
Fairfield, Ala. T2	9.11
Houston S5	9.35
Jacksonville, Fla. M8	9.21
Johnstown, Pa. B2	9.11
Joliet, Ill. A7	9.11
KansasCity, Mo. S5	9.35
Kokomo, Ind. C16	9.21
LosAngeles B3	9.55
Minnequa, Colo. C10	9.35
Pittsburg, Calif. C11	9.55
S.Chicago, Ill. R2	9.11
S.SanFrancisco C10	9.55
SparrowsPt., Md. B2	9.21
Sterling, Ill. (37) N15	9.21

BALE TIES, Single Loop	Col.
AlabamaCity, Ala. R2	212
Atlanta A11	212
Bartonville, Ill. K4	214
Crawfordsville, Ind. M8	214
Donora, Pa. A7	212
Duluth A7	212
Fairfield, Ala. T2	212
Houston S5	217
Jacksonville, Fla. M8	214
Joliet, Ill. A7	212
KansasCity, Mo. S5	217
Kokomo, Ind. C16	214
Minnequa, Colo. C10	217
SparrowsPt., Md. B2	214
Sterling, Ill. (7) N15	214

WIRE, Barbed	Col.
AlabamaCity, Ala. R2	193**
Aliquippa, Pa. J5	190§
Atlanta A11	197*
Bartonville, Ill. K4	199
Crawfordsville, Ind. M8	198
Donora, Pa. A7	193†
Duluth A7	193†
Fairfield, Ala. T2	193†
Houston S5	198**
Jacksonville, Fla. M8	198
Johnstown, Pa. B2	196§
Joliet, Ill. A7	193†
KansasCity, Mo. S5	198**
Kokomo, Ind. C16	195†
Minnequa, Colo. C10	198**
Monessen, Pa. P7	196§
Pittsburg, Calif. C11	213†
Rankin, Pa. A7	193†
S.Chicago, Ill. R2	193**
SparrowsPoint, Md. B2	198§
Sterling, Ill. (7) N15	198

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City, Ala. R2	17.85	19.40**
Aliq'ppa, Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Chicago W13	17.85	....
Cleveland A7	17.85	....
Craw'sville M8	17.95	19.80‡‡
Fostoria, O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City, Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r, Mass. W12	19.10	19.70†
Pitts., Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
SparrowsPt. B2	17.95	19.75§
St'ling (37) N15	17.95	19.80
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

FENCE POSTS	Col.
Birmingham C15	177
ChicagoHts., Ill. C2, I-2	177
Duluth A7	177
Franklin, Pa. F5	177
Johnstown, Pa. B2	177
Marion, O. P11	177
Minnequa, Colo. C10	182
Tonawanda, N.Y. B12	177

WOVEN FENCE, 9-15 Ga.	Col.
Ala.City, Ala. R2	187**
Aliq'ppa, Pa. 9-11½ Ga. J5	190§
Atlanta A11	191*
Bartonville, Ill. K4	193
Crawfordsville, Ind. M8	192
Donora, Pa. A7	187†
Duluth A7	187†
Fairfield, Ala. T2	187†
Houston S5	192**
Jacksonville, Fla. M8	192
Johnstown, Pa. (42) B2	190§
Joliet, Ill. A7	187†
KansasCity, Mo. S5	192**
Kokomo, Ind. C16	189†
Minnequa, Colo. C10	192**
Pittsburg, Calif. C11	210†
Rankin, Pa. A1	187†
S.Chicago, Ill. R2	187**
Sterling, Ill. (7) N15	192

WIRE, Merchant Quality 6 to 8 gage	An'ld	Galv.
Ala.City, Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta (48) A11	9.00	9.75*
Bartonville (48) K4	9.85	9.90
Buffalo W12	9.00	9.55†
Chicago W13	9.00	9.55**
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80††
Donora, Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55
Houston (48) S5	9.25	9.80**
Jack'vill, Fla. M8	9.10	9.80‡‡
Johnstown (48) B2	9.00	9.675§
Joliet, Ill. A7	9.00	9.55†
KansasCity (48) S5	9.25	9.80**
Kokomo (48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Minnequa C10	9.25	9.80**
Monessen (48) P7	8.65	9.35§
Palmer, Mass. W12	9.30	9.85†
Pitts., Calif. C11	9.95	10.50†
Rankin, Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt. (48) B2	9.10	9.775§
St'ling (37) (48) N15	9.10	9.80
Struthers, O. Y1	9.00	9.65‡
Worcester, Mass. A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.10c. **Subject to zinc equalization extras.

FASTENERS

SCREWS, NUTS, BOLTS

(Consumer discounts per cent off list prices, plain finishes. For less than full container quantities, add 25 per cent; attaching nuts to bolts in sizes ¼ in. through ⅝ in. diameter through 8 in. in length, price on application. Discounts are determined by the quantity of screws, nuts, and bolts ordered for one destination at one time.)

Base, one keg	43.00
20,000 lb or more	53.00

SCREWS, SETSCREWS

Hex Screws and High Strength Hex Screws, through 1 in. x 12 in.:

Base, one keg	43.00
20,000 lb or more	53.00

Hex Screws 1⅛ in. diameter and larger: See net price schedule.

Fillister Head Screws, coarse thread:

Packages	+70.00
Bulk	+28.00

Flat Head Screws, coarse thread:

Packages	+100.00
Bulk	+52.00

Setscrews, Square Head, Cup-point, coarse thread:

Packages	+10.00
Bulk	15.00

(Bulk discounts on fillister, flat head, and set screws apply only to products ordered in these minimum quantities: ¼ in. through ⅝ in. diameter, 15,000 pieces; 7/16 in. through ⅝ in. diameter, 5000 pieces; and ¾ in. through 1 in. diameter, 2000 pieces.)

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great. Structural ½ in. larger 12.85 7/16 in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over.)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity, Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa, Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg, Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling, N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint, Md. B2	26.20	38.50	47.90	61.30	80.30
St. Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan, Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless		Elec. Weld
		H.R.	C.D.	H.R.
1	13	....	27.24	23.12
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

	Standard			Tee Rails
Rails	No. 1	No. 2	All No. 2	60 lb Under
Bessemer, Pa. U5	5.75	5.65	....	6.725
Ensley, Ala. T2	5.75	5.65	....	6.725
Fairfield, Ala. T2	....	....	....	6.725
Gary, Ind. U5	5.75	5.65	....	....
Huntington, W.Va. C15	....	....	....	6.725
Johnstown, Pa. B2	....	....	....	(16) 6.725
Lackawanna, N.Y. B2	5.75	5.65	....	6.725
Minnequa, Colo. C10	5.75	5.65	....	7.225
Steelton, Pa. B2	5.75	5.65	....	....

TIE PLATES

Fairfield, Ala. T2	6.875
Gary, Ind. U5	6.875
Lackawanna, N.Y. B2	6.875
Minnequa, Colo. C10	6.875
Seattle B3	7.025
Steelton, Pa. B2	6.875
Torrance, Calif. C11	7.025

JOINT BARS

Bessemer, Pa. U5	7.25
Fairfield, Ala. T2	7.25
Joliet, Ill. U5	7.25
Lackawanna, N.Y. B2	7.25
Minnequa, Colo. C10	7.25
Steelton, Pa. B2	7.25

AXLES

Ind.Harbor, Ind. S13	9.125
Johnstown, Pa. B2	9.125

SCREW SPIKES

Lebanon, Pa. B2	15.10

TRACK BOLTS, Untreated

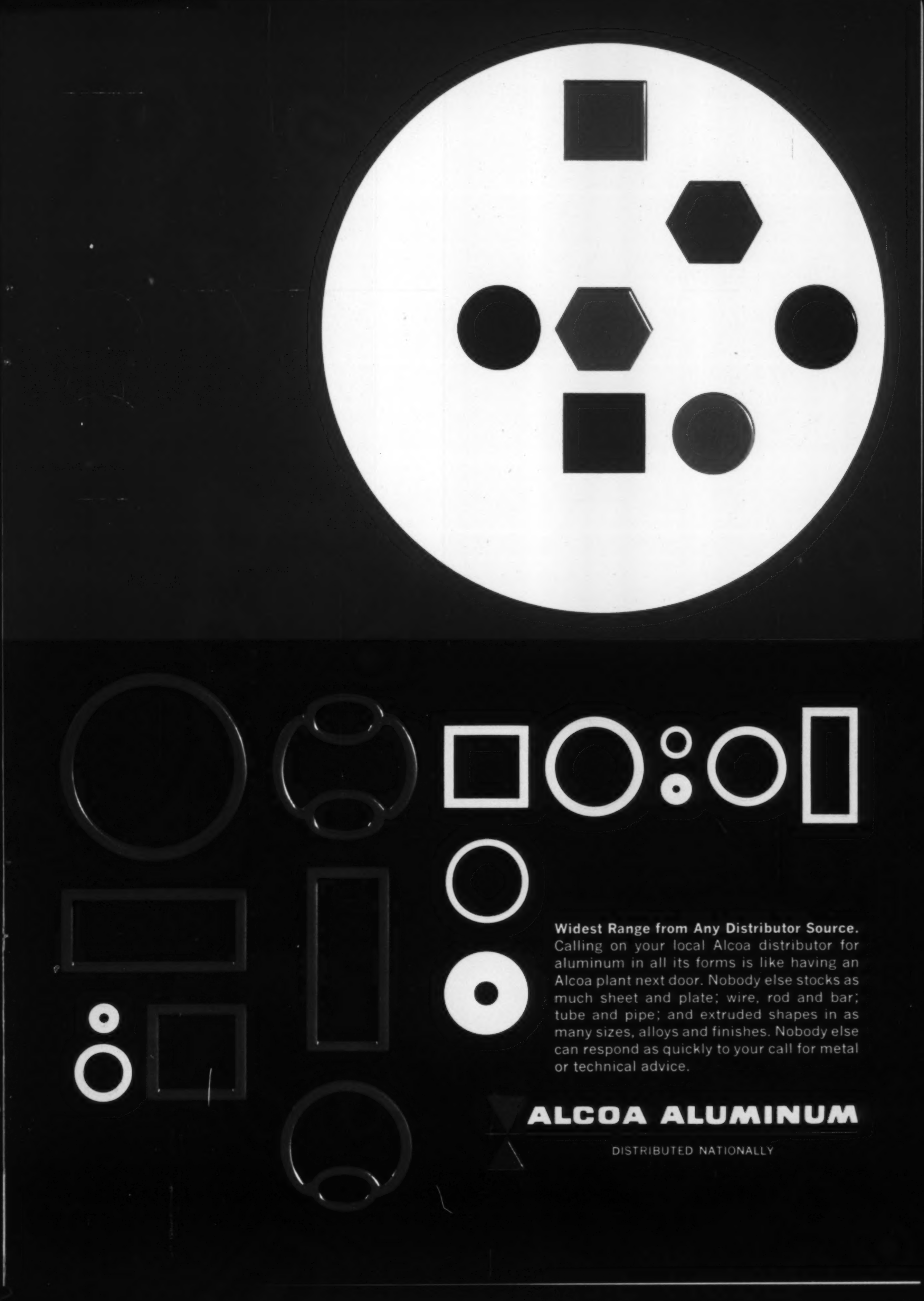
Cleveland R2	15.35
KansasCity, Mo. S5	15.35
Lebanon, Pa. B2	15.35
Minnequa, Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield, Ala. T2	10.10
Ind.Harbor, Ind. I-2, Y1	10.10
KansasCity, Mo. S5	10.10
Lebanon, Pa. B2	10.10
Minnequa, Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago, Ill. R2	10.10
Struthers, O. Y1	10.10
Youngstown R2	10.10

FOOTNOTES

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2⅛ in. and smaller hexagons; 9.625c for larger rounds and hexagons and other shapes.



Widest Range from Any Distributor Source. Calling on your local Alcoa distributor for aluminum in all its forms is like having an Alcoa plant next door. Nobody else stocks as much sheet and plate; wire, rod and bar; tube and pipe; and extruded shapes in as many sizes, alloys and finishes. Nobody else can respond as quickly to your call for metal or technical advice.

ALCOA ALUMINUM

DISTRIBUTED NATIONALLY

DEF
ABC
GHI
4
1
LKJ
5
MNO
6
PRS
7
8
TUV
9
WXY
0
OPERATOR

ALABAMA
Birmingham 5
Hinkle Supply Company, Inc.
(Fairfax 2-4541)
The J. M. Tull Metal & Supply Co., Inc.
(Fairfax 3-1612)
ARIZONA
Phoenix
Ducommun Metals & Supply Co.
(Bridge 5-4471)
Pacific Metals Company, Ltd.
(Alpine 8-7821)
CALIFORNIA
Berkeley 10
Ducommun Metals & Supply Co.
(Thornwall 1-1820)
Los Angeles 59
Benjamin Metals Company
(Rod & Bar) (Nevada 6-0611)
Los Angeles 54
Ducommun Metals & Supply Co.
(Ludlow 8-0161)
Los Angeles 22
Pacific Metals Company, Ltd.
(Raymond 3-5431)
Los Angeles 22
Tubesales (Tube & Pipe)
(Raymond 3-7781)
San Diego
Ducommun Metals & Supply Co.
(Gridley 7-3141)
San Diego 1
Pacific Metals Company, Ltd.
(Belmont 4-3253)
San Francisco 7
Pacific Metals Company, Ltd.
(Underhill 3-5600)
COLORADO
Denver 16
Marsh Steel & Aluminum Co.
(Keystone 4-1241)
Denver 16
Metal Goods Corporation
(Dudley 8-4141)
CONNECTICUT
Milford
Edgcomb Steel of New England, Inc.
(Trinity 4-1631)
Windsor
Whitehead Metals, Inc.
(Murdock 8-4921)
FLORIDA
Jacksonville 5
The J. M. Tull Metal & Supply Co., Inc.
(Evergreen 7-5561)
Miami
The J. M. Tull Metal & Supply Co., Inc.
(Oxford 6-0150)
Tampa 10
The J. M. Tull Metal & Supply Co., Inc.
(3-6741)
GEORGIA
Atlanta 2
The J. M. Tull Metal & Supply Co., Inc.
(Jackson 5-3871)
HAWAII
Honolulu 14
Aluminum Products Hawaii, Ltd.
(94-861)
IDAHO
Boise
Pacific Metal Company (3-6468)
ILLINOIS
Chicago 80
Central Steel and Wire Company
(Republic 7-3000)
Chicago 80
The Corey Steel Company
(Bishop 2-3000)
Chicago 23
Steel Sales Corporation
(Bishop 7-7700)
INDIANA
Indianapolis 18
Steel Sales Co. of Indiana, Inc.
(Liberty 6-1535)
KANSAS
Wichita
Marsh Steel & Aluminum Co.
(Whitehall 2-3231)
KENTUCKY
Louisville 3
Williams and Company, Incorporated
(Juniper 3-7781)

LOUISIANA
New Orleans 12
Metal Goods Corporation
(Jackson 2-7373)
MARYLAND
Baltimore 7
Whitehead Metals, Inc.
(Windsor 4-2000)
MASSACHUSETTS
Boston 19
Eastern Metal Mill Products Co.
(Highlands 2-5900)
Cambridge 39
Whitehead Metals, Inc.
(Trowbridge 6-4680)
MICHIGAN
Detroit 12
Central Steel and Wire Company
(Twinbrook 2-3200)
Detroit (Hazel Park)
Meier Brass & Aluminum Co.
(Jordan 6-3902)
Detroit 10
Steel Sales Co. of Michigan
(Tyler 6-3000)
MINNESOTA
Minneapolis 13
Steel Sales Co. of Minnesota
(Sterling 1-4893)
MISSOURI
North Kansas City 16
Marsh Steel & Aluminum Co.
(Grand 1-3505)
North Kansas City 16
Metal Goods Corporation
(Grand 1-3516)
St. Louis 14
Metal Goods Corporation
(Harrison 7-1234)
St. Louis 10
Steel Sales Co. of Missouri, Inc.
(Prospect 1-5255)
NEW HAMPSHIRE
Nashua
Edgcomb Steel of New England, Inc.
(Tuxedo 3-7731)
NEW JERSEY
Elizabeth
Adam Metal Supply of New Jersey
(Flanders 1-2550)
Englewood
Tubesales (Tube & Pipe)
(Lowell 7-4400)
Harrison
Whitehead Metals, Inc.
(Humbolt 5-5900)
Hillside 5
Miller Steel and Aluminum
Division of Robert Campbell Co., Inc.
(Waverly 6-6000)
NEW YORK
Albany 1
Eastern Metals Warehouse, Inc.
(IV 9-3281)
Buffalo 17
Brace-Mueller-Huntley, Inc.
(TR 7-8700)
Buffalo 7
Whitehead Metals, Inc.
(TR 6-3100)
New York (Long Island City 1)
Adam Metal Supply
(Stilwell 6-7737)
New York (Brooklyn)
Strahs Aluminum Company, Inc.
(Browning 2-7000)
New York 14
Whitehead Metals, Inc.
(Watkins 4-1500)
Rochester 5
Adam Metal Supply of Rochester
(Locust 2-4260)
Rochester 1
Brace-Mueller-Huntley, Inc.
(Congress 6-6560)
Rochester 10
Whitehead Metals, Inc.
(Butler 8-2141)
Syracuse 1
Brace-Mueller-Huntley, Inc.
(Howard 3-3341)
Syracuse 1
Whitehead Metals, Inc.
(Howard 3-6241)

NORTH CAROLINA
Charlotte 6
Edgcomb Steel Company
(Franklin 5-3361)
Greensboro
Edgcomb Steel Company
(Broadway 5-8421)
OHIO
Cincinnati 14
Central Steel and Wire Company
(Avon 1-2230)
Cincinnati 37
Williams and Company, Incorporated
(Valley 1-5555)
Cleveland 28
A. M. Castle & Co.
(Axminster 2-7600)
Cleveland 14
Williams and Company, Incorporated
(Utah 1-5000)
Columbus 12
Williams and Company, Incorporated
(Axminster 4-1623)
Toledo 12
Williams and Company, Incorporated
(Greenwood 5-8861)
OKLAHOMA
Tulsa 13
Metal Goods Corporation
(Temple 6-2561)
OREGON
Portland 9
Pacific Metal Company
(Capitol 7-0693)
PENNSYLVANIA
Philadelphia 34
Edgcomb Steel Company
(Garfield 3-6300)
Philadelphia 33
Metal Supply Company
(Center 6-0220)
Philadelphia 40
Whitehead Metals, Inc.
(Baldwin 9-2323)
Pittsburgh 33
Williams and Company, Incorporated
(Cedar 1-8600)
York
Edgcomb Steel Company (47-1931)
RHODE ISLAND
Slatersville
Edgcomb Steel of New England, Inc.
(Poplar 7-0900)
SOUTH CAROLINA
Greenville
The J. M. Tull Metal & Supply Co., Inc.
(Cedar 3-8366)
TENNESSEE
Memphis 6
Metal Goods Corporation
(Whitehall 8-3407)
TEXAS
Dallas
McCormick Steel Company
(CH 7-3104)
Dallas 35
Metal Goods Corporation
(Fleetwood 1-3271)
Houston 1
McCormick Steel Company
(OR 2-6671)
Houston 1
Metal Goods Corporation
(Riverside 7-1110)
UTAH
Salt Lake City 1
Pacific Metals Company, Ltd.
(Davis 8-2222)
WASHINGTON
Seattle 8
Ducommun Metals & Supply Co.
(Parkway 5-1500)
Seattle 4
Pacific Metal Company (Main 2-6925)
Spokane 4
Pacific Metal Company
(Keystone 5-3681)
WISCONSIN
Milwaukee 1
Central Steel and Wire Company
(Humboldt 1-5000)
Milwaukee 9
Steel Sales Co. of Wisconsin
(Hilltop 2-2020)

Call The Aluminum Man . . . his stock's the most complete!

Your Alcoa distributor sales representative—*The Aluminum Man*—maintains a warehouse bulging with sheet and plate; tube and pipe; extruded shapes; wire, rod and bar. His stock represents the widest range of aluminum products available from any distributor source. He can arrange for them to be slit, sawed or sheared to your specifications—furnish technical advice you may need on alloy selection and fabrication techniques. He's your fastest supply line for aluminum in any form when you need it. Your nearest Alcoa distributor is listed on this page, so give him a call . . . soon. Aluminum Company of America, 845-J Alcoa Building, Pittsburgh 19, Pa.

ALCOA ALUMINUM
DISTRIBUTED NATIONALLY

Call *The Aluminum Man* . . .
he's your Alcoa distributor
sales representative

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.25	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

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*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	—Rerolling— Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	43.50
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	46.75
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	45.00
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	49.50
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	49.50
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	57.25
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	76.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	84.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	62.25
380	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 Cb-Ta	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	75.25
403	....	....	26.75	....	29.75	31.50	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	26.75	31.00	29.75	31.50	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	38.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	42.00
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Elwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Phoenix Steel Corp.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels, Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Corp.; Vanadium-Alloy Steel Co., Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	—Plates— Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.10	43.00

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*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Claymont, Del. P4; Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

—Grade by Analysis (%)— W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	...	T-1	1.840
18	4	2	....	...	T-2	2.005
13.5	4	3	....	...	T-3	2.105
18.25	4.25	1	4.75	...	T-4	2.545
18	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
No. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago, Ill. R2	66.00	66.50	66.50	67.00
S.Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
NevilleIsland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W.Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Other U. S. Districts				
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....

	Basic	No. 2 Foundry	Malleable	Bessemer
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
PortColborne, Ont. A25	65.00	65.00	65.50	66.00
SaultSte.Marie, Ont. A25	65.00	65.00	65.50	66.00

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*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%. Foundry grade, 1.75% or under, deduct 50c.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3, J1	78.00
PortColborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$99.00
NiagaraFalls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73 00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Chicago I-3 (Phos. 0.075% max)	71.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Phos. 0.075% max)	71.00
Erie, Pa. I-3 (Phos. 0.075% max)	71.00
NevilleIsland, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb orders. Prices will vary with total weight of the order. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS			STRIP	BARS				PLATES	
	Hot Rolled	Cold Rolled	Galv.	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	STRUCTURAL SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.85	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	9.50	10.26	10.06	11.25	9.65	11.70	16.38	9.85	9.60	11.10
Birmingham	8.46	10.20	10.59	9.45	8.26	13.14	16.65	8.47	8.41	10.05
Boston	9.90	10.40	11.52	12.40	10.05	13.35	16.59	10.50	9.83	11.85
Buffalo	9.30	10.05	11.80	11.70	9.45	11.45	16.30	9.90	9.40	11.80
Charlotte, N. C.	9.95	11.22	10.55	11.35	10.00	12.68	....	10.20	9.95	11.75
Chicago	9.22	10.20	10.13	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	9.38	10.26	10.18	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	9.22	10.66	10.92	11.51	9.33	11.25	16.06	9.96	9.30	11.59
Dallas	9.07	9.88	11.75	10.63	8.48	12.98	16.95	8.71	8.31	9.68
Detroit	9.48	10.46	10.50	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	8.67	9.48	11.35	10.23	8.08	13.10	16.55	8.31	7.91	11.57
Indianapolis	9.66	10.64	10.57	11.83	9.66	11.09	16.39	10.01	9.50	11.79
KansasCity	9.21	10.87	11.35	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	10.35	11.20	12.10	12.40	10.25	14.20	17.35	10.45	10.30	12.30
Memphis, Tenn.	9.63	10.35	10.80	11.29	9.48	12.70	16.53	9.67	9.32	11.18
Milwaukee	9.36	10.34	10.27	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	9.57	10.55	11.05	11.74	9.57	11.00	16.30	9.92	9.41	11.70
Newark, N. J.	9.81	10.34	11.54	12.37	10.05	13.25	16.40	10.35	9.79	11.82
New York	10.07	10.78	11.35	12.37	10.44	13.25	16.40	10.90	10.22	11.82
Philadelphia	9.50	10.00	10.66	11.25	9.65	11.95	16.38	9.85	9.60	11.10
Pittsburgh	9.22	10.53	11.68	11.49	9.22	11.25	15.95	9.57	9.06	11.35
Portland, Oreg.	10.40	12.25	12.35	12.40	10.40	16.65	17.85	11.00	10.55	12.70
St. Louis	9.42	10.58	10.51	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	9.57	10.24	11.39	11.74	9.57	11.49	16.54	9.92	9.41	11.70
San Francisco	10.65	11.65	11.75	12.70	10.55	15.10	17.25	11.10	10.80	12.95
Seattle	11.35	12.45	13.40	12.80	10.80	16.20	17.85	11.50	10.95	13.60
Spokane, Wash.	11.20	12.30	13.25	12.65	10.65	16.20	17.85	11.35	10.80	13.45

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ⅝ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x12½ in.; carbon plate, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hitchins, Olive Hill, Ky., Athens, Troup, Tex., Clearfield, Curwensville, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., Frostburg, Md., $133; Templeton, Pa., $135; Salina, Pa., $138; Niles, Ohio, $139; Lehi, Utah, $175.

Super-Duty: Ironton, Ohio, St. Louis, Mexico, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Frostburg, Md., $200; Stevens Pottery, Ga., $210; Troup, Tex., $215; Lehi, Utah, $263.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Hawstone, Thompsontown, Pa., Ensley, Ala., Portsmouth, Ohio, St. Louis, $158; Warren, Niles, Windham, Ohio, $163; E. Chicago, Ind., Joliet, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City., Colo., $133; Philadelphia, Clearfield, Pa., $138; Warren, Ohio, $148.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Johnstown, Pa., Vandalia, Mo., $97; Chester, New Cumberland, W. Va., Freeport, Vanport, Merrill Station, Clearfield, Pa., Wellesville, Irondale, New Salisbury, Ohio, $100; Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120; Lehi, Utah, $175.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $250; Danville, Ill., $253; Fords, N. J., Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., Frostburg, Md., $260; Troup, Tex., $265.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $320; Troup, Tex., Fords, N. J., Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $360; Troup Tex., Fords, N. J., Philadelphia, $365.

Tar Bonded Brick (per ton)

Dolomite: Narlo, Ohio, $87.50. Dolomite-Magnesite: Narlo, Ohio, $109.50. Magnetite: Narlo, Ohio, $128.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310; Reesdale, Pa., $355.

Runners (per 1000)

Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234; Reesdale, Pa., $245.

Dolomite (per ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines, Chewelah, Wash., $46; minus ⅝ in. grains bulk, Luning, Nev., $46; ⅝ in. grains with fines (periclase), Baltimore, $73, Pascagoula, Miss., $90.

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*—9 in. x 4½ x 2.50 straights.

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon (N.T.):	
Forging	$97.00
Rerolling	78.00
Alloy (N.T.)	115.00
Wire Rods:	
Carbon	5.70
Alloy	6.40
Wire (carload lots):	
Merchant annealed	8.40
Low carbon indus.	7.20
Upholstery spring	8.55
M.B. spring	8.85
Bars & Small Shapes:	
Carbon, merchant	5.30
Carbon, special	5.85
Alloy	6.40
Bar Mill Brands:	
Carbon	5.40
Alloy	8.05
Bars, Reinforcing	5.30
Structural Shapes:	
Standard carbon	5.50
Angles & zees	5.40
Plates, Carbon:	
Sheared	5.45
Universal mill	5.10
Sheets & Coils, Hot Rolled:	
Carbon sheet	4.95
Carbon strip	5.00
Sheets & Coils, Cold Rolled:	
Carbon sheet	6.35
Carbon strip:	
(0.080 and lighter)	6.35
(0.081 and heavier)	6.35
Sheets & Coils, Galvanized:	
Standard quality	6.70
Culvert quality	7.00
Sheets, Porcelain Enameling	7.45
Sheets & Coils, Electrical:	
Field grade	9.00
Electrical grade	10.15
Sheet Piling	6.15
Skelp	4.70
Rails, Heavy	5.55
Rails, Light	5.70
Joint Bars	6.55
Tie Plates	6.35
Grinding Balls (3 in. diam.)	7.00
Tin Mill Products	(Per base box; 100 lb base wt)
Coke tin plate (1.25 lb pot yield)	$10.60
Electrolytic tin plate (0.25 lb coating)	9.10
Black plate	8.30
Nails, Wholesale:	
Carload lots	Col. 110

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF$_2$ content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $29-$29.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85§
40 mesh bags	7.50††
Electrolytic Iron, Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	27.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe	36.75, ton deld. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	37.80
Bronze powder, 90/10	56.80
Copper, all types	15.00*
Lead	7.50*
Manganese, 500 lb and up	25.00*
Nickel, all types	0.78-1.06
Nickel-Silver	56.00
Solder	7.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	23.20
Cobalt:	Dollars
98.5%, minus 100-300 mesh	1.57-1.58
99.5% below 5 microns	2.32
Molybdenum	4.35

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*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe, except as noted.)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	*$5.55*	*$5.60*	*$5.50*	*$5.40*	*$5.70*
Bar Size Angles	5.85	5.90	5.80	5.70	6.00
Structural Angles	5.75	5.80	5.70	5.60	5.90
I-Beams	*5.75*	*5.90*	*5.80*	*5.70*	*6.00*
Channels	*5.75*	*5.90*	*5.80*	*5.70*	*6.00*
Plates (basic bessemer)	*5.65*	*5.70*	*5.60*	*5.50*	*5.80*
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	23.66	23.72	23.59	23.31	25.04
Barbed Wire (†)	6.25	6.30	6.20	6.10	6.40
Merchant Bars	*6.05*	*6.10*	*6.00*	*5.90*	*6.20*
Hot-Rolled Bands	*6.05*	*6.10*	*6.00*	*5.90*	*6.20*
Wire Rods, Thomas No. 5 (Niederrhein)	5.80*	....	5.75	5.75	6.00
Wire Rods, O.H., No. 5 (Niederrhein)	6.00*	....	5.95	5.95	6.20
Wire Rods, O.H. (Sumitomo, Japan)	5.95	....	5.90	5.90	6.05
Bright Common Wire Nails (§)	*7.30*	*7.35*	*7.25*	*7.15*	*7.45*

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†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier. *Except Boston.

Ores

Lake Superior Iron Ore

(Prices effective for the 1961 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi nonbessemer	$11.45
Mesabi bessemer	11.60
Old Range nonbessemer	11.70
Old Range bessemer	11.85
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1961; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	25.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian (lump), 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$15.75-16.25*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†
South African Transvaal	
44% no ratio	18.75
48% no ratio	24.00-26.00†
Turkish	
48% 3:1	35.00-37.00†
Domestic	
Rail nearest seller	
18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.40

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.00-3.50
60-65%	3.60-4.00

Vanadium Ore

Cents per lb V$_2$O$_5$

Domestic	31.00

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*Before duty. †Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens	
Connellsville, Pa. furnace	$14.75-15.25
Connellsville, Pa. foundry	18.00-18.50
Oven Foundry	
Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn. $98. For Neville Island, Pa., prices add $2.50. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3% for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot of 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%), Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffied, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 5% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb. $1. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.27, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 58-65%, C 5-7%, Si 4-6%, S 0.03% max, 20.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 58-65%,C 4.25% max, Si 1.0% max, S 0.03%, 21.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Low-Carbon Ferrochrome: (Simplex) Cr 63-66% or 68-71%: C 0.025% max, 31.50c; C 0.010% max, 32.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Cr 68-73%; C 0.25% max, 33.00c. Cr 65-71%; C 0.05% max, 32.00c; C 0.10% max, 31.75c; C 0.20% max, 31.50c; C 0.50% max, 31.25c; C 1.0% max, 31.00c; C 1.5%, 30.75c; C 2.0% max, 30.50c, carlots, lump, bulk, delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25 max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 22.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 22.50c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: .Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ⅛" thick) $.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 13.5c per lb contained Si. Packed, c.l. 16.0c, ton lot 17.45c, less ton 19.1c f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $2.45 per lb (all quantities) of contained W. Delivered.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅛ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2⅛ lb of Mo each). $1.60 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, Add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l., packed 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-70%). Per lb of contained Mo in 2000-lb container, f.o.b. Langeloth and Washington, Pa., $1.89 in all sizes except powdered which is $1.95.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.60; in bags, $1.59, f.o.b. Langeloth and Washington, Pa.

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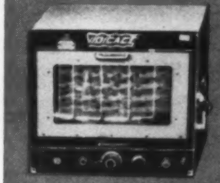

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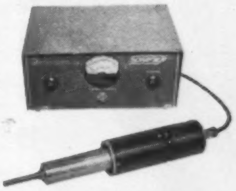

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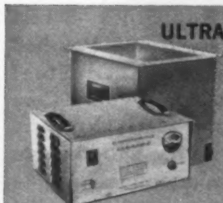

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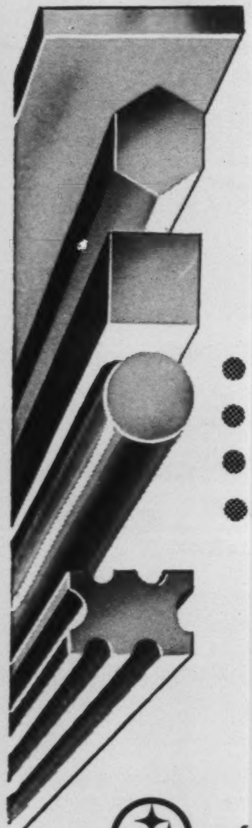

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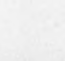
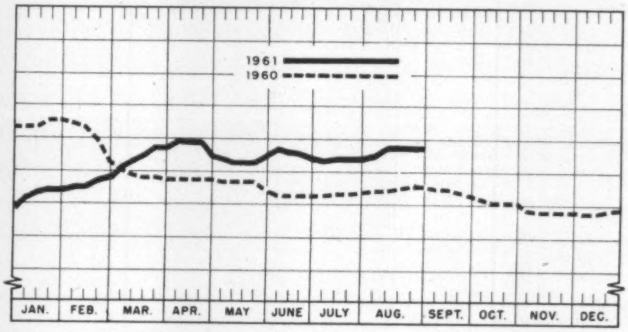


Write for *Bulletin 4011-E*

STEELMAKING SCRAP PRICE COMPOSITE

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania—Compiled by STEEL.



Aug. 30 1961	Week Ago	Month Ago	Year Ago	July Avg
$38.67	$38.33	$37.83	$32.67	$37.10

Scrap Price Advance Anticipated

Traders looking for higher prices when mills resume buying to support more active steelmaking operations this fall. Industrial bundle bids at Chicago are highest this year

Scrap Prices, Page 142

- **Chicago**—Steelmaking grades of scrap are up $1-$2 a ton on the announcement of $42.62 as the successful bid on 9100 tons of No. 1 factory bundles to be produced in September by a district auto stamping plant. The bid was $2.71 higher than a month ago, and it is the highest bid this year. Allowing $2.60 a ton as switching charge and $1 a ton as brokerage, the mill delivered price is $46.22. Quotations on that grade have been $44-$45.

Other steelmaking grades are sensitive to the higher bids on the No. 1 factory bundles.

- **Pittsburgh**—With district steelmaking operations at the highest level in three months, local dealers are optimistic for demand in the immediate future. Turnings are in stronger demand, and the market for industrial material is firmer. Brokers' bids on No. 1 factory bundles from an automotive stamping plant are reported to be slightly above those offered a month ago. The next mill purchase of No. 1 heavy melting scrap is expected to be at $37-$38 a ton.

- **Philadelphia**—Scrapmen are anticipating a more active domestic demand for the steelmaking grades as steel production continues to climb. Export shipments are holding steady. Prices are unchanged at levels recently established.

- **New York** — Brokers' buying prices are unchanged, the market being supported primarily by export demand. However, prospects for better domestic buying are contributing to a stronger tone with steelmaking operations increasing.

- **Cleveland**—Early closings on the September automotive lists reportedly brought 50 cents to $1 over prices bid a month ago. Later closings were expected to register similar advances, though the threatened auto strike may push the market higher because of possible shorter supply over coming weeks. Generally, the market is firm with the outcome of the automotive bids expected to point the way for dealer prices in the weeks ahead. Some dealers are hoping the market will hold its present level. They fear increased competition from blast furnace hot metal should scrap prices rise much higher.

- **Buffalo**—Scrap is moving slowly in this area, but dealers are hoping for new mill orders shortly. Prices appear moderately strong, largely due to strength at other marketing points and the promise of a buying pickup this month.

- **Cincinnati**—Prices are unchanged, but they are untested. Dealers continue to talk about increases of $1-$2 a ton when the mills begin ordering this fall.

- **St. Louis**—Brokers report a strong market though most of their business involves tonnage for shipment out of the district. Local mills are holding the line on their offering prices.

- **Birmingham**—A price rise of $1 a ton on No. 1 heavy melting and No. 1 bundles to $38-$39 is reported here. Bar crops and plate are quoted $44-$45, structurals $43-$44, random length rails $42-$43.

- **Houston** — Export prices are strong on spot and nearby tonnage, but traders doubt overseas demand will be great enough to sustain high prices when scrap begins to move this fall. Current intake is low, but the flow is expected to improve shortly. New Orleans and Baton Rouge prices for delivered scrap were quoted last week at $2 under the recent high. No. 1 heavy melting was quoted at $41 and No. 2 heavy melting at $36, late September delivery.

- **Los Angeles**—The market tone is firmer. September prospects are promising. A strengthening of mill demand and larger exports are stimulating the flow of material.

- **Seattle**—Mill buying continues, and material is still moving on export account, giving the market a degree of activity. Exporters are shipping to the Orient both in full cargoes and parcels. There's strong demand for No. 1 heavy melting, and some buyers are paying $47 for that grade and $34 for No. 2 bundles. Cast iron is relatively weak, No. 1 cupola being quoted at $42.

- **San Francisco**—Prices are fluctuating on the bases of tonnage and speed of delivery. Negotiated prices vary over a differential of $3 a ton, but, in the main, No. 1 heavy melting is moving at about $43.

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Aug. 30, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Aug. 30	$38.67
Aug. 23	38.33
July Avg.	37.10
Aug. 1960	32.33
Aug. 1956	57.13

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	29.00-30.00
No. 1 dealer bundles	36.00-37.00
No. 2 bundles	24.00-25.00
No. 1 busheling	35.00-36.00
No. 1 factory bundles	46.00-47.00
Machine shop turnings	*15.00-16.00*
Mixed borings, turnings	*15.00-16.00*
Short turnings	*20.00-21.00*
Cast iron borings	*19.00-20.00*
Cut structurals:	
2 ft and under	42.00-43.00
3 ft and under	39.00-40.00
Heavy turnings	27.00-28.00
Punchings & plate scrap	43.00-44.00
Electric furnace bundles	43.00-44.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	34.00-35.00
Stove plate	34.00-35.00
Unstripped motor blocks	24.00-25.00
Clean auto cast	35.00-36.00
Drop broken machinery	45.00-46.00§

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Random rails	45.00-46.00
Angles, splice bars	44.00-45.00
Railroad specialties	46.00-47.00
Rails, rerolling	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	180.00-185.00
18-8 turnings	105.00-110.00
430 bundles & solids	85.00-90.00
410 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	*41.00-42.00*
No. 1 hvy melt., dealer	*39.00-40.00*
No. 2 hvy melting	*34.00-35.00*
No. 1 factory bundles	*45.00-46.00*
No. 1 dealer bundles	*40.00-41.00*
No. 2 bundles	*24.00-25.00*
No. 1 busheling, indus.	*41.00-42.00*
No. 1 busheling, dealer	*39.00-40.00*
Machine shop turnings	*17.00-18.00*
Mixed borings, turnings	*19.00-20.00*
Shovel turnings	*19.00-20.00*
Cast iron borings	*19.00-20.00*
Cut structurals, 3 ft	*45.00-46.00*
Punchings & plate scrap	*46.00-47.00*

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	37.00-38.00
Unstripped motor blocks	33.00-34.00
Clean auto cast	47.00-48.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	*43.00-44.00*
R.R. malleable	47.00-48.00
Rails, 2 ft and under	49.00-50.00
Rails, 18 in. and under	50.00-51.00
Angles, splice bars	46.00-47.00
Axles	*57.00-58.00*
Rails, rerolling	*60.00-61.00*

Stainless Steel Scrap

18-8 bundles, solids	190.00-195.00
18-8 turnings	110.00-115.00
430 bundles & solids	95.00-100.00
430 turnings	55.00-60.00

BUFFALO

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	31.00-32.00
Shovel turnings	17.00-18.00
Machine shop turnings	13.00-14.00
Cast iron borings	15.00-16.00
Low phos. structurals and plates, 2 ft and under	39.00-40.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	44.00-45.00

Railroad Scrap

Rails, random lengths	42.00-43.00
Rails, 3 ft and under	48.00-49.00
Railroad specialties	41.00-42.00
Rails, rerolling	63.50-64.50

CLEVELAND

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	24.00-25.00†
No. 1 factory bundles	42.00-43.00
No. 1 bundles	36.00-37.00
No. 2 bundles	23.00-24.00†
No. 1 busheling	36.00-37.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	34.00-35.00
Cut structurals, plate, 2 ft and under	41.00-42.00
Low phos, punchings & plate	37.00-38.00
Alloy free, short shovel turnings	18.00-19.00
Electric furnace bundles	38.00-39.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	26.00-27.00
Heavy breakable cast	28.00-29.00
Stove plate	36.00-37.00
Unstripped motor blocks	31.00-32.00
Brake shoes	37.00-38.00
Clean auto cast	47.00-48.00
Burnt cast	32.00-33.00
Drop broken machinery	48.00-49.00

Railroad Scrap

R.R. malleable	48.00-49.00
Rails, 2 ft and under	49.00-50.00
Rails, random lengths	45.00-46.00
Rails, 18 in. and under	50.00-51.00
Cast steel	42.00-43.00
No. 1 railroad cast	49.00-50.00
Railroad specialties	44.00-45.00
Angles, splice bars	45.00-46.00
Rails, rerolling	50.00-57.00

Stainless Steel Scrap
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	160.00-165.00
18-8 turnings	95.00-100.00
430 clips, bundles, solids	80.00-85.00
430 turnings	15.00-25.00†

YOUNGSTOWN

No. 1 heavy melting	39.00-40.00
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	40.00-41.00
No. 1 bundles	40.00-41.00
No. 2 bundles	25.00-26.00†
Machine shop turnings	14.00-15.00†
Shovel turnings	19.00-20.00†
Cast iron borings	19.00-20.00†
Low phos.	41.00-42.00
Electric furnace bundles	41.00-42.00

Railroad Scrap

No. 1 R.R. heavy melt.	41.00-42.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	34.00-35.00
No. 2 bundles	20.50-21.50
No. 1 busheling	33.00-34.00
Machine shop turnings	9.00-10.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00
Cast iron borings	11.00-12.00
Low phos., 18 in.	40.00-41.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Heavy breakable cast	28.00-29.00
Charging box cast	34.00-35.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 18 in. and under	47.00-48.00
Rails, random lengths	41.00-42.00

ST. LOUIS (Brokers' buying prices)

No. 1 heavy melting	*36.00*
No. 2 heavy melting	29.00
No. 1 bundles	35.00
No. 2 bundles	24.00
No. 1 busheling	34.00
Machine shop turnings	13.50
Shovel turnings	17.00

Cast Iron Grades

No. 1 cupola	37.00
Charging box cast	34.00
Heavy breakable cast	32.00
Unstripped motor blocks	34.00
Clean auto cast	38.00
Stove plate	33.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.50
Rails, random lengths	40.00
Rails, rerolling	55.00
Rails, 18 in. and under	44.00†
Railroad specialties	42.00
Angles, splice bars	40.00†

PHILADELPHIA

No. 1 heavy melting	40.00
No. 2 heavy melting	36.00
No. 1 bundles	43.00
No. 2 bundles	24.00-26.00
No. 1 busheling	43.00
Electric furnace bundles	44.00
Mixed borings, turnings	17.00†
Shovel turnings	20.00
Machine shop turnings	14.00
Heavy turnings	25.00†
Structurals & plates	44.00-46.00
Couplers, springs, wheels	45.00
Rail crops, 2 ft & under	51.00-53.00

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	40.00
Drop broken machinery	49.00-50.00†
Malleable	49.00†

NEW YORK (Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
Machine shop turnings	4.50-5.00†
Mixed borings, turnings	5.00-5.50†
Shovel turnings	6.00-7.00†
Low phos. structurals & plates	34.00-35.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	31.00-32.00

Stainless Steel

18-8 sheets, clips, solids	160.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.50-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 1 busheling	28.50-29.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

DETROIT (Brokers' buying prices)

No. 1 heavy melting	*33.00-34.00*
No. 2 heavy melting	25.00-26.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00
No. 1 busheling	*32.00-33.00*
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00

Cast Iron Grades

No. 1 cupola	32.00-33.00
Mixed cast	30.00-31.00
Stove plate	27.00-28.00
Heavy breakable	26.00-27.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	39.00-40.00

Stainless Steel Scrap

18-8 bundles & solids	170.00-175.00
18-8 turnings	70.00-75.00
430 bundles & solids	70.00-75.00

BIRMINGHAM

No. 1 heavy melting	*38.00-39.00*
No. 2 heavy melting	30.00-31.00
No. 1 bundles	*38.00-39.00*
No. 2 bundles	22.00-23.00
No. 1 busheling	38.00-39.00
Cast iron borings	10.00-11.00
Machine shop turnings	18.00-19.00
Shovel turnings	20.00-21.00
Bar crops and plate	*44.00-45.00*
Structurals & plate	*43.00-44.00*
Electric furnace bundles	38.00-39.00
Electric furnace:	
3 ft and under	36.00-37.00
2 ft and under	37.00-38.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	42.00-43.00
Unstripped motor blocks	31.00-32.00
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, 2 ft and under	46.00-47.00
Rails, random lengths	*42.00-43.00*
Angles, splice bars	43.00-44.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	*36.00-37.00*
No. 2 heavy melting	*33.00-34.00*
No. 1 bundles	38.00-39.00
No. 2 bundles	*24.00-25.00*
Machine shop turnings	12.50-13.00
Crushed turnings	17.00
Low phos. plate & structurals:	
3 ft	41.00-42.00
2 ft and under	45.00-46.00

Cast Iron Grades

No. 1 cupola	*41.50-42.50*
Heavy breakable	25.00-26.00
Foundry malleable	29.00-30.00
Unstripped motor blocks	30.00-31.00

Railroad Scrap

R.R. heavy melt. (3 ft)	40.00-41.00

LOS ANGELES

No. 1 heavy melting	*43.00-45.00*
No. 2 heavy melting	*40.00-41.00*
No. 1 bundles	*41.00*
No. 2 bundles	*29.00*
No. 2 bundles (export)	*30.00*
Machine shop turnings	*20.00*
Shovel turnings	*20.00*
Cast iron borings	*17.00-18.00*
Electric furnace scrap	*50.00-52.00*

Cast Iron Grades

No. 1 cupola	*49.00-50.00*

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-45.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	41.00-42.00
No. 2 bundles	31.00
Shovel turnings	18.00
Electric furnace	54.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable	38.00
Unstripped motor blocks	39.00
Stove plate (f.o.b. plant)	37.00

SEATTLE (Prepared, f.o.b. car)

No. 1 heavy melting	46.00
No. 1 hvy (unprepared)	41.00
No. 2 heavy melting	43.00
No. 2 hvy (unprepared)	38.00
No. 2 bundles	32.00
Shovel turnings	16.00-18.00
Electric furnace	52.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable cast	38.00
Stove plate (f.o.b. plant)	36.00
Unstripped motor blocks	37.00

SAN FRANCISCO

No. 1 heavy melting	43.00**
No. 2 heavy melting	40.00**
No. 1 bundles	34.00**
No. 2 bundles	*29.00***
Machine shop turnings	*16.00-18.00*
Mixed borings, turnings	*16.00-18.00*
Cast iron borings	*16.00-18.00*
Heavy turnings	*16.00-18.00*
Shovel turnings	*16.00-18.00*

Cast Iron Grades

No. 1 cupola	*45.00-46.00*
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

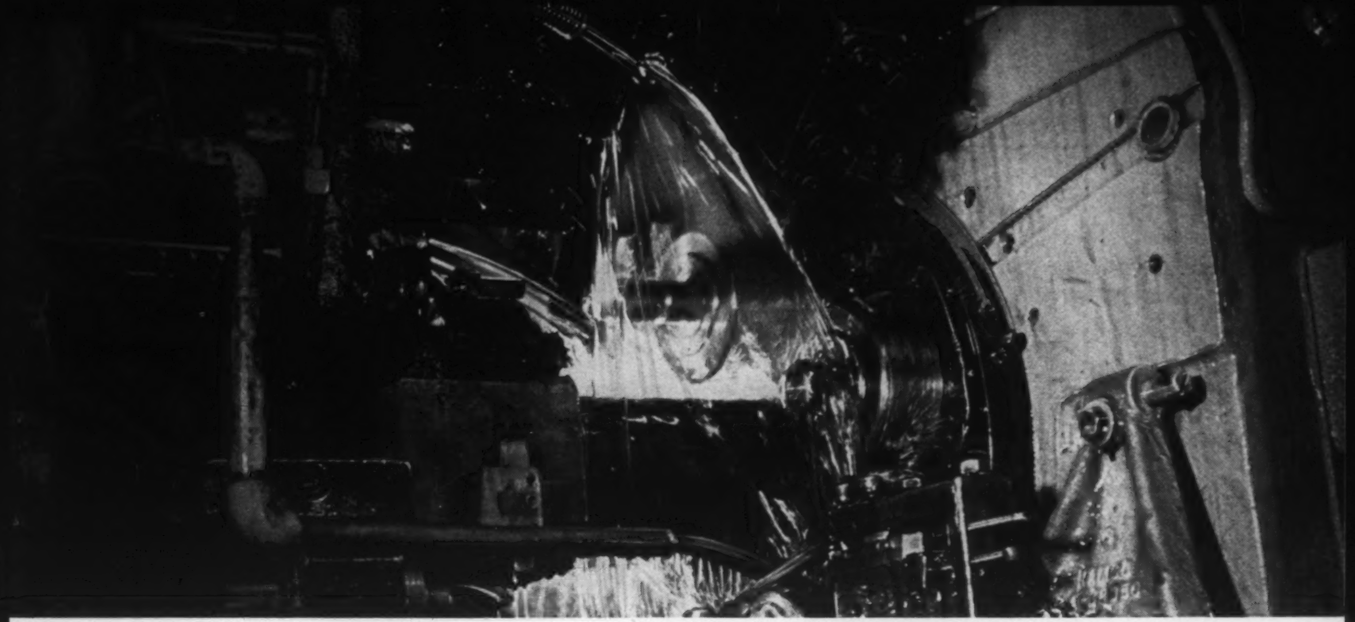
(Brokers' buying prices; net tons)

No. 1 heavy melting	31.00
No. 2 hvy melt, 2 ft & under	30.00
No. 1 bundles	31.00
No. 2 bundles	23.50
Mixed steel scrap	23.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	31.00
Unprepared	25.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	32.00

**Based mainly on export sales.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.



Garia oils are completely clear. Operators can see through the oil and keep a close watch on machining operation.

CUTTING:

Shell puts heavy-duty properties into transparent cutting oils that lengthen tool life three significant ways

Today, Shell's new Garia® Oils are helping machine shops improve metal finish and prolong tool life—even in heavy-duty cutting. And because Garia is transparent, operators can see the work at all times.

Read how Shell Garia Oils can reduce rejects, cut maintenance and overhead costs in your shop.

UNTIL RECENTLY, most heavy-duty cutting oils were opaque fluids which obscured the work.

Shell scientists took up the problem. They experimented with different formulae until they found the *exact combination* that retained the necessary properties—but did not seriously darken the oil.

Now Shell Garia Oils have the transparency of light mineral oils and the rugged qualities of heavy-duty oils.

With Shell's improved Garia Oils, operators can see through the oil film. Work can be inspected more easily.

Garia Oils prolong tool life in three key ways:

1. Garia Oils help prevent metal pick-up. Shell Garia Oils form a more effective film between the work and the tool. This provides better anti-weld protection, and helps prevent metal pick-up on tools.

2. Garia Oils help keep work cooler. Even with high-speed cutting, the metal stays cool.

Cooling helps extend tool life, and helps assure a better finish on the work. Operating costs are lower too.

3. Garia Oils wet faster. They reach the tool point rapidly, cover newly exposed surfaces quickly.

Compact range

Today's range of Garia Oils covers every kind of metal cutting operation.

Result: you do not have to carry large cutting oil inventories. You can do more jobs with fewer Garia Oils.

For all the facts, see your Shell Industrial Products Representative. Or write: Shell Oil Company, 50 West 50th Street, New York 20, N. Y.

SHELL

A BULLETIN FROM SHELL

—where 1,997 scientists are working to provide better products for industry

Copper Group Adopts Coding System

Nonferrous Metal Prices, Page 146

A NEW, SIMPLIFIED, numerical system for designating nearly 200 commercially important wrought copper and copper alloys has been adopted by members of the Copper & Brass Research Association (CABRA), New York.

• Accent on Copper — Beginning with Copper No. 101—formerly known as oxygen free certified copper—CABRA has assigned a three digit number to every product which has gained the acceptance of the industry. Two broad categories have been established—copper numbers and copper alloy numbers. And to put further emphasis on the base metal, mills producing the products will be referred to as copper mills rather than brass mills.

About one-third of the numbered alloys are considered standard by the industry. The rest are either special—ordered by designating the specific composition of the metal—or proprietary products.

• Advantages — CABRA says that "in addition to establishing a quicker reference method for the wrought copper metals, the new system will also abolish the classification problems which existing nomenclature frequently created (for) the U. S. Customs Bureau and domestic truck and rail carriers. It also provides a more coherent category of copper alloy identification for the Department of Defense."

The three digit system will be of value in the use of data processing equipment and other business machines employed by industry.

• Room for Growth—As the list shows, there are gaps in the system to allow for future designations as new or infrequently used alloys become of sufficient interest to users.

Standard Classification for Copper and Copper Alloys (Wrought Products Only)

(CABRA standard alloys are shown in bold type)

COPPER NUMBER	PREVIOUS COMMONLY ACCEPTED TRADENAME
101	Oxygen Free Certified
102	**Oxygen Free**
104	Oxygen Free with Silver
105	Oxygen Free with Silver
110	**Electrolytic Tough Pitch**
111	Electrolytic Tough Pitch, Anneal Resist
113	Tough Pitch with Silver
114	Tough Pitch with Silver
116	Tough Pitch with Silver
120	Phosphorus Deoxidized, Low Residual Phosphorus
121	None
122	**Phosphorus Deoxidized, High Residual Phosphorus**
123	None
125	Fire Refined, Tough Pitch
127	Fire Refined, Tough Pitch with Silver
128	Fire Refined, Tough Pitch with Silver
130	Fire Refined, Tough Pitch with Silver
141	Arsenical Tough Pitch
142	Phosphorus Deoxidized, Arsenical
145	Phosphorus Deoxidized, Tellurium Bearing
147	Sulfur Bearing
150	Zirconium Copper

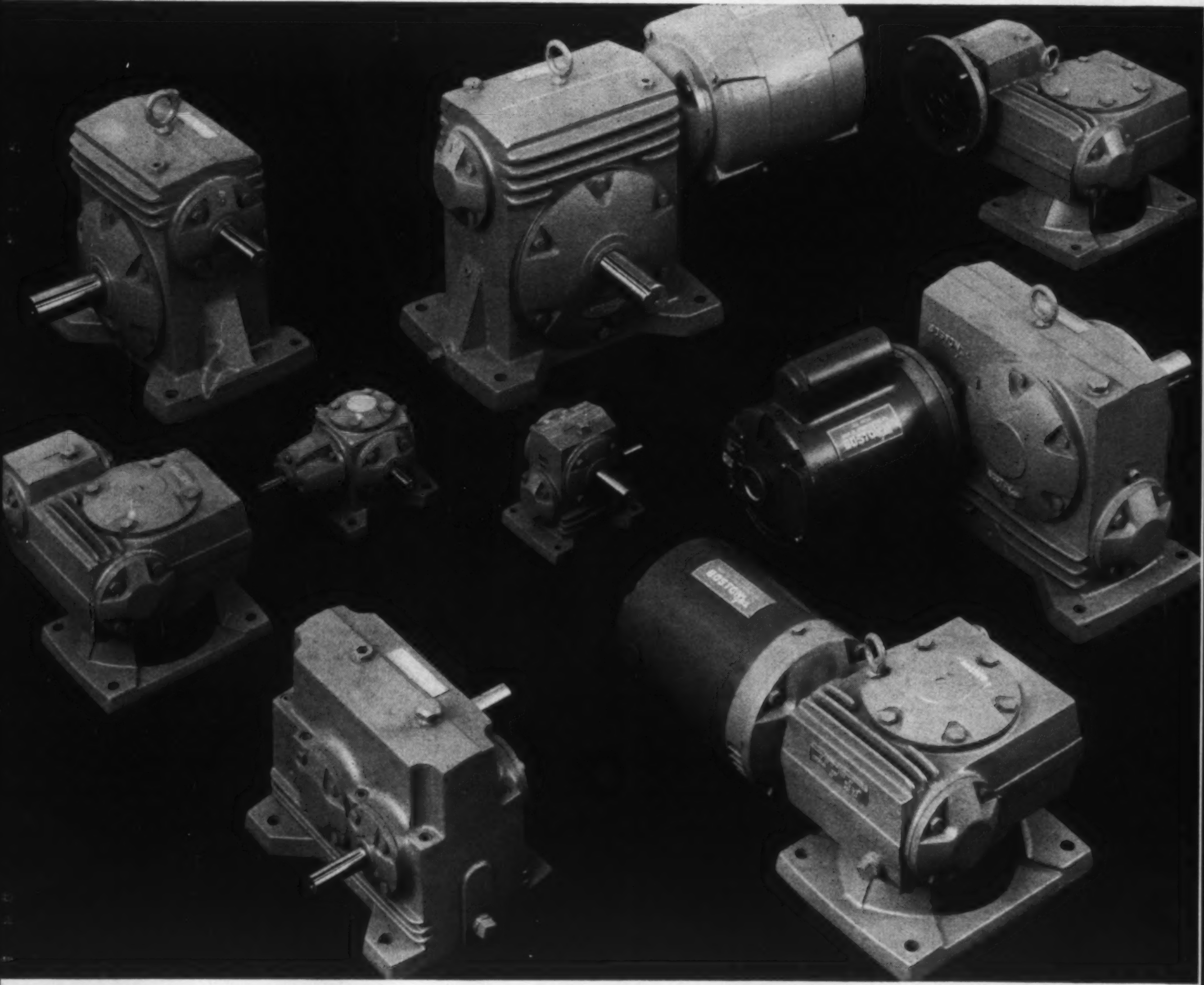
COPPER ALLOY NUMBER	PREVIOUS COMMONLY ACCEPTED TRADENAME
162	Cadmium Copper
164	None
165	None
172	Beryllium Copper
182	Chromium Copper
184	Chromium Copper
185	Chromium Copper
190	None
191	None
193	None
210	**Gilding, 95%**
220	**Commercial Bronze, 90%**
226	**Jewelry Bronze, 87½%**
230	**Red Brass, 85%**
234	None
240	**Low Brass, 80%**
260	**Cartridge Brass, 70%**
261	None
262	None
268	**Yellow Brass 66% (sheet)**
270	**Yellow Brass 65% (rod, wire)**
274	Yellow Brass 63%
280	**Muntz Metal 60%**
298	Brazing Alloy
310	Leaded Commercial Bronze (low lead)
314	**Leaded Commercial Bronze**
316	Leaded Commercial Bronze (nickel bearing)
320	Leaded Red Brass
325	None
330	**Low Leaded Brass (tube)**
331	None
332	**High Leaded Brass (tube)**
335	**Low Leaded Brass**
340	**Medium Leaded Brass 64½%**
342	**High Leaded Brass 64½%**
344	None
347	None
348	None
350	Medium Leaded Brass 62%
353	**High Leaded Brass 62%**
356	**Extra High Leaded Brass**
360	**Free Cutting Brass**
362	None
365	**Leaded Muntz Metal, Uninhibited**
366	**Leaded Muntz Metal, Arsenical**
367	**Leaded Muntz Metal, Antimonial**
368	**Leaded Muntz Metal, Phosphorized**
370	**Free Cutting Muntz Metal**
371	None
377	**Forging Brass**
385	**Architectural Bronze**
405	None
408	None
410	None
411	None
413	None
415	None
419	None
420	None
422	None
425	None
430	None
432	None
434	None
435	None
438	None
442	Admiralty Uninhibited
443	**Admiralty Arsenical**
444	**Admiralty Antimonial**
445	**Admiralty Phosphorized**
462	Naval Brass 63½%
464	**Naval Brass**
465	**Naval Brass Arsenical**
466	**Naval Brass Antimonial**

(Please turn to Page 147)

BOSTON Gear® QUALITY

time-proved REDUCTOR® and RATIOMOTOR® reliability

largest selection for worm-geared drives **from stock**



Horizontal or vertical, right angle or parallel, single or double reduction.
Reductors – for .10 to 15 HP drives – ratios 1:1 to 3600:1.
Ratiomotors – .035 to 10 HP – output torque 4 to 9400 in. lbs.
Detachable motor design. Motor can be changed in minutes.
Ratiomotors sold also without motors as **Flanged Reductors**.
1605 stock sizes, types, ratios. See Catalog 57 for complete listings.
IN STOCK at your nearby DISTRIBUTOR

BOSTON Gear®

© Boston Gear Works, 1961
Quincy 71, Mass.

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 29.00; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 95.5%, 32.50; Lone Star brand, 33.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 30.50-31.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $40 per lb and up nom.

Copper: Electrolytic, 31.00 deld; custom smelters, 31.00 nom; lake, 31.00 deld; fire refined, 30.75 deld.

Germanium: Purified, ingots, less than 1 kg 37.50 per gram; 1-10 kg 32.00 per gram; 10 kg or more, 29.95 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld; 24-99 lb, $9.50; 100-449 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.90 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $188-191 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 81.25; 10-lb pig, unpacked, 89.00; "XX" nickel shot, 88.75; "F" nickel shot for addition to cast iron, in kegs, 81.75; "F" nickel, 5 lb ingots, 82.75. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.09; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel 77.50.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $5.25 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 124.75.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max), $1.37 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.75 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.25.

Zinc: Prime Western, 11.50; brass special 11.70; intermediate, 11.70, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.35; special high grade, 12.50 deld. Diecasting alloy ingot No. 3, 13.75; No. 2, 14.25; No. 5, 14.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7.25-7.75 per lb; 100-500 lb, $6.75-7.25 per lb; 500-1000 lb, $6.25-6.75; over 1000 lb, $6.25 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.00; No. 12 foundry alloy (No. 2 grade), 21.25; 5% silicon alloy, 0.60 Cu max, 23.00; 13 alloy, 0.60 Cu max, 22.75; 195 alloy, 24.25; 108 alloy, 21.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 22.75; grade 2, 21.50; grade 3, 20.50; grade 4, 19.50.

Brass Ingot: Red brass, No. 115, 32.00; tin bronze, No. 225, 41.25; No. 245, 35.75; high leaded tin bronze, No. 305, 36.00; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.955, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.35; l.c.l., 36.98. Weatherproof 20,000-lb lots, 37.05; l.c.l., 37.80.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $5.70-15.50; sheared mill plate, $4.45-9.00; wire, $5.00-9.50; forging billets, $3.00-4.75; hot-rolled and forged bars, $3.39-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $11.00-16.00; H.R. strip, $11.00-15.00; C.R. strip, $13.00-18.00; forged or H.R. bars, $11.00-15.00.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	147	126	145
Strip, C.R.	133	114	145
Plate, H.R.	134	116	133
Rod, Shapes, H.R. .	116	95	116
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.183	24-72	72-180	45.40-48.00
0.183-0.154	24-72	72-180	45.40-48.00
0.154-0.120	24-72	72-180	45.90-48.80
0.120-0.096	24-72	72-180	45.90-48.80
0.096-0.076	24-72	72-180	46.40-50.30
0.076-0.060	24-72	72-180	46.90-51.10
0.060-0.047	24-72	72-180	47.40-52.30
0.047-0.037	24-72	72-180	47.90-53.70
0.037-0.030	24-72	72-180	48.40-55.30
0.030-0.023	24-60	72-180	48.90-57.10
0.023-0.018	24-48	72-144	49.40-57.40
0.018-0.014	24-48	72-144	51.20-58.00
0.014-0.011	24-48	72-144	53.50-60.00
0.011-0.0085	24-36	72-96	56.20
0.0085-0.007	24-36	72-96	59.20
0.007-0.006	24-36	72-96	62.50

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grades (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 24.75-25.25; No. 2 heavy copper and wire, 23.00-23.50; light copper 20.25-20.75; No. 1 composition red brass, 21.50-22.00; No. 1 composition turnings, 20.50-21.00; new brass clippings, 18.50-19.00; light brass, 15.50-16.00; heavy yellow brass, 16.50-17.00; new brass rod ends, 17.50-18.00; auto radiators, unsweated, 18.25-18.75; cocks and faucets, 18.50-19.00; brass pipe, 18.50-19.00.

Lead: Soft scrap lead, 7.25-7.50; battery plates, 3.00-3.25; linotype and stereotype, 8.50-8.75; electrotype, 8.00-8.25; mixed babbitt, 10.00-10.50.

Monel: Clippings, 26.00-26.50; old sheets, 25.00-25.50; turnings, 18.50-19.00; rods, 25.00-25.50.

Nickel: Sheets and clips, 56.00-58.00; rolled anodes, 56.00-58.00; turnings, 43.00; rod ends, 56.00-58.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 3.00-3.50; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 8.50-9.00; clean borings and turnings, 4.00-4.50; segregated low copper clips, 10.75-11.25; segregated high copper clips, 9.75-10.25; mixed low copper clips, 10.25-10.75; mixed high copper clips, 9.75-10.25.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 9.50-10.00; clean borings and turnings, 7.00-7.50; segregated low copper clips, 14.50-15.00; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.50; clean borings and turnings, 8.50-9.00; segregated low copper clips, 13.50; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50-13.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.00; light scrap, 52.00; turnings and borings, 37.00.

Copper and Brass: No. 1 heavy copper and wire, 28.50; No. 2 heavy copper and wire, 26.50; light copper, 24.25; refinery brass (60% copper) dry copper content, 25.25-25.375.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 28.50; No. 2 heavy copper and wire, 26.50; light copper, 24.50; No. 1 composition borings, 24.00-24.50; No. 1 composition solids, 24.50-25.00; heavy yellow brass solids, 19.00; yellow brass turnings, 18.00; radiators, 20.50-21.00.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES d (Based on copper at 31.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	56.13b	50.36–51.36	....	57.32	27.00	27.00	26.25
Yellow Brass	49.27	35.77c	49.56	53.43	20.375	19.50c	18.50c
Low Brass, 80%	52.15	52.09	52.44	56.21	22.875	22.625	22.125
Red Brass, 85%	53.17	53.11	53.46	57.23	23.875	23.625	23.125
Com. Bronze, 90%	54.73	54.67	55.02	58.54	24.75	24.50	24.00
Manganese Bronze	57.69	51.27	61.54	....	19.25	19.00	18.50
Muntz Metal	51.94	47.25	....	....	19.125	18.875	18.375
Naval Brass	53.94	47.75	60.25	58.10	19.00	18.75	18.25
Silicon Bronze	61 39	60.58	60.68	79.80	26.50	26.25	25.75
Nickel Silver, 10%	65.56	67.16	66.91	....	26.00	25.75	13.00
Phos. Bronze, A-5% ...	76.97	77.47	76.72	78.90	28.50	28.25	27.25

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Free cutting. d. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

(Concluded from Page 144)

COPPER ALLOY NUMBER	PREVIOUS COMMONLY ACCEPTED TRADENAME
467	**Naval Brass Phosphorized**
470	Naval Brass Welding & Brazing Rod
472	Brazing Alloy
482	Naval Brass, Medium Leaded
485	**Naval Brass High Leaded**
501	None
502	**Phosphor Bronze E**
505	None
507	None
508	None
509	None
510	**Phosphor Bronze A**
518	Phosphor Bronze
521	**Phosphor Bronze C**
524	**Phosphor Bronze D**
532	Phosphor Bronze B
534	Phosphor Bronze B-1
544	**Phosphor Bronze B-2**
546	Phosphor Bronze B-2 (P 0.50 max)
606	None
608	None
610	None
612	None
614	**Aluminum Bronze D**
616	None
618	None
620	None
622	None
624	None
626	None
628	None
630	None
637	None
639	None
642	None
647	None
651	**Low Silicon Bronze B**
653	None
655	**High Silicon Bronze A**
656	None
658	None
661	None
665	None
667	Manganese Brass
670	Manganese Bronze B
675	**Manganese Bronze A**
680	Bronze, Low Fuming (nickel)
681	Bronze, Low Fuming
685	None
687	**Aluminum Brass Arsenical**
692	Silicon Brass
694	Silicon Red Brass
697	None
702	None
703	None
704	Copper Nickel 5%
705	Copper Nickel 7%
706	**Copper Nickel 10%**
707	None
708	Copper Nickel 11%
710	Copper Nickel 20%
715	**Copper Nickel 30%**
720	Copper Nickel 40%
732	None
735	None
740	None
745	**Nickel Silver 65-10 (sheet)**
752	**Nickel Silver 65-18**
754	**Nickel Silver 65-15**
757	**Nickel Silver 65-12**
762	None
764	None
766	None
770	**Nickel Silver 55-18**
773	None
774	None
782	None
784	None
786	None
788	None
790	None
792	None
794	None

Where identical tradenames are shown for more than one copper or copper alloy number, there is some variation in the maximum or minimum limits of one or more elements. Where there is no tradename, it indicates a proprietary product or a special alloy. For compositions, see Standard Classification for Copper & Copper Alloys (Wrought Products Only), Copper & Brass Research Association, 420 Lexington Ave., New York 17, N. Y.

CLASSIFIED ADVERTISING

Representatives Wanted

NEW PLANT—NEW PRODUCTS

We need Mfg. Representatives and/or Sales Engineering firms to distribute our products including standard steel Storage Buildings; Closures; Fall-Out Shelters. Also Standard Steel Guard Rail Fence and Posts that meet State Highway specifications of most states. Write or wire:

Permco Metal Fabricators Co.
Lowellville, Ohio

Help Wanted

CHIEF ENGINEER

Eastern manufacturer seeks a technically sound man as Chief Engineer to direct a 15 to 20 man department in product design. Background must be in thermodynamics or heat transfer. We want a good processing background to design for low cost production, and a good knowledge of fabrication and materials. Administrative supervisory ability, as Chief or possibly Assistant, is also required. M. E. degree is desired, but would be offset by a strong design background in heat exchangers and thermodynamics. Competitive salary is offered. Please reply in detail regarding experience and products, in complete confidence.

Reply Box 959, STEEL,
Penton Bldg. Cleveland 13, Ohio

Help Wanted

ELECTRICAL ENGINEER—EE or equivalent in Steel Mill and Mechanical experience. Relocate in South. Excellent opportunity for right man. Reply Box 958, STEEL, Penton Bldg., Cleveland 13, Ohio.

Representatives Wanted

MANUFACTURER'S AGENT WANTED

For areas of Chicago, Cleveland, Pittsburgh and Detroit. Heat Exchangers (recuperators, air heaters, etc.) for steel industry, foundries and others, by well established Pittsburgh Company. Applications only from experienced companies with background in industrial heating and excellent contacts in respective industries in their areas. Product sales prices range between $10,000.00 and $100,000.00 and higher. Reply Box 956, STEEL, Penton Bldg., Cleveland 13, Ohio.

FOR CLASSIFIED RATES
And Further information write
STEEL, Penton Bldg., Cleveland 13, O.

Help Wanted

DIRECTOR OF SALES

Midwest job shop gear manufacturer, a quality leader in its products, has an outstanding growth opportunity for a man, age 35 to 45, to direct its sales effort. Will sell through factory representatives and small direct sales force, do personal selling himself, and study new product possibilities. Must be a self-starter, and must have experience selling O.E.M.'s, preferably farm, road, or similar equipment manufacturers, or steel mills. Experience in gears not required but must at least be in a mechanical component sold to O.E.M.'s direct and through representatives. Speed reducer experience, for example, would be an asset. M.E. training required. Your full reply invited in confidence; our personnel know of this opening.

Reply Box 957, STEEL
Penton Bldg. Cleveland 13, Ohio

METALLURGIST

A long established manufacturer of drop forgings desires a graduate metallurgist, preferably with three to five years aircraft forging experience primarily on ferrous metals. Reply stating age, education, background, experience, and salary required.

The Billings & Spencer Company
1 Laurel Street Hartford 1, Conn.
Attention: Vice President

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World's Largest Inventory
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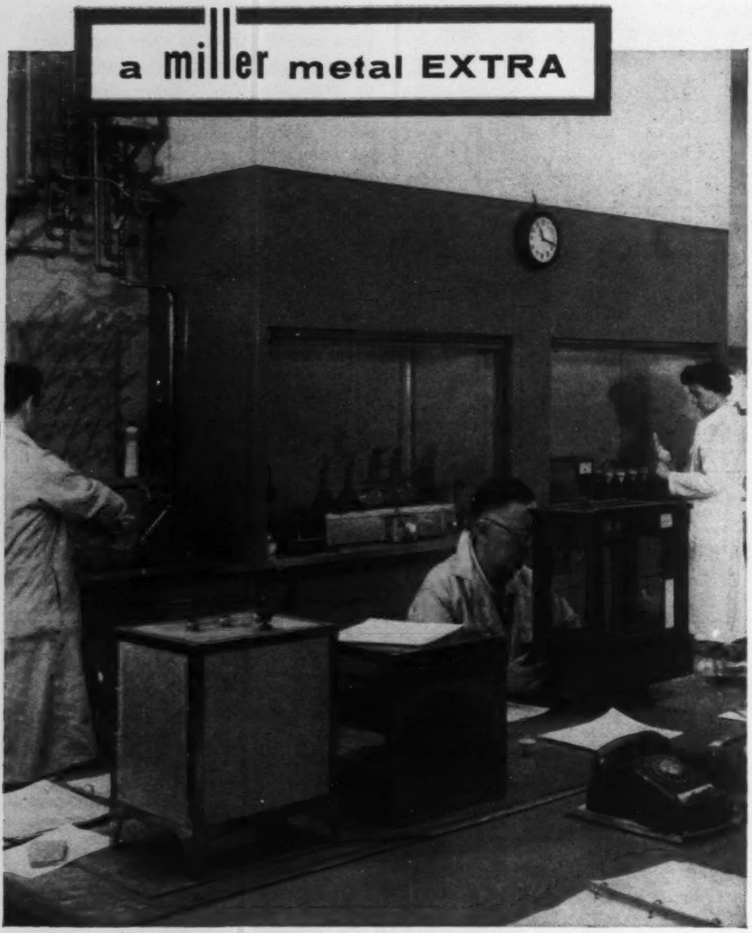

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Miller metallurgists make sure every bit of metal that leaves the Miller mills exactly meets all customer specifications. Your individual metal order is checked and rechecked at every stage of production . . . with the skill and care an old Bavarian brewmaster applies to his art. Each time you order metal you can be sure that everyone at Miller feels that his job isn't finished until that metal is in your plant, on your machines and completely satisfactory in every way. For expert technical help, meticulously produced high-grade metal and dependable delivery, place your next order for brass, bronze or nickel-silver strip, copper or copper-alloy tube in special shapes and sizes with the specialists at Miller . . . where you're a name, not just a number on the job ticket.

ROLLING MILL
DIVISION
Meriden, Connecticut

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Tube Subsidiary
A. H. WELLS, INC.
Waterbury, Connecticut

Pig Iron . . .

Pig Iron Prices, Page 136

Pig iron shipments were larger in August than they were in the preceding month; for some sellers, they were the largest since April and May of last year. September is expected to register additional gains.

Jones & Laughlin Steel Corp. blew in a second blast furnace at its Cleveland Works. The stack had been out of production several months for repairs and improvements. Weirton Steel Div., National Steel Corp., relighted its No. 2 blast furnace after a two month shutdown for elining. Colorado Fuel & Iron Corp. blew in its blast furnace at Birdsboro, Pa., down since May, 1960.

Spanish bessemer iron is offered at $60.50 a ton, c.i.f. Philadelphia, in fairly sizable lots; up to $64 on small lots.

Plates . . .

Plate Prices, Page 129

More subcontracting of welded plate tonnage by Naval shipyards is reported. New England yards building submarines are farming out work involving alloy Grade Hy-80.

Miscellaneous plate orders are barely holding the recent low volume. Prompt mill shipments (two to three weeks) serve as a brake on forward buying. Also, the volume of fabricated plate tonnage being estimated is light.

Demand for plate for pipelines is limited. The recent pickup reported in the Midwest proved to be only a flurry. On the West Coast, plate fabricators report their backlogs are low and no projects of importance are before the market.

Competition for new fabricated plate tonnage is severe. As in the case of fabricated structurals, prices on fabricated plates are under heavy pressure from buyers.

Demand for sheared plates is noticeably stiffer in the East, and some mills there have little tonnage available for shipment under four to five weeks. That reflects a spurt in shipwork and increased pipeline activity. Also, railroad requirements have gained.

Alan Wood Steel Co.'s new 96 in. plate mill was started in operation last week, replacing its 72 in. mill.

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THE 52100 HOUSE

INDUCTION · CONSUMABLE · LEADED

PETERSON STEELS, INC.

Union, N. J. · Wethersfield, Conn.
Detroit, Mich. · Melrose Park, Ill.

PERCY: "These nuts look almost good enough to eat."

ALBERT: "They sure do. Look at those clean threads, those well-shaped contours."

PERCY: "That's how we know they must be Bethlehem nuts. They make all kinds of nuts, bolts too . . . standard and special . . . and fast delivery."

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For Strength
. . . Economy
. . . Versatility

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Sales: Bethlehem Steel Export Corporation

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STEEL

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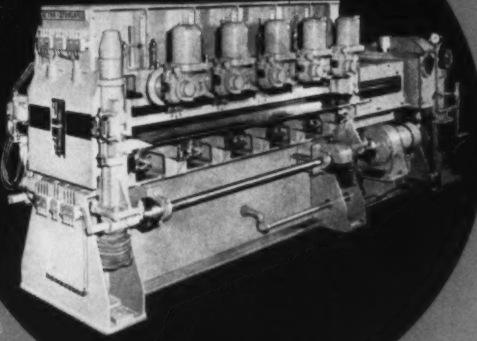
What kind of roller leveler do you need for your particular product? Want high speed? We have high speed levelers. Want an economical model for less demanding work? We have one of the best models in the business. Want a quick opening head? We have either hydraulic or motor-operated or hand-operated models. Want centralized lubrication? We equip all levelers with centralized lubrication with the exception of a few models. Want antifluting? We have it. Want individual adjustment or centralized adjustment? We have both types. Want more roll life per redressing? All of our rolls are induction hardened. Want an existing leveler reconditioned? We have an efficient service setup. What size leveler do you need — 1⅛" up to 18" diameter work rolls? We make all sizes and types. In fact, the Aetna-Standard Division of Blaw-Knox is one of the major manufacturers of Roller Levelers. For information, write to Sheet and Strip Sales, Aetna-Standard Division, Blaw-Knox Company, 300 Sixth Avenue, Pittsburgh, Pennsylvania.



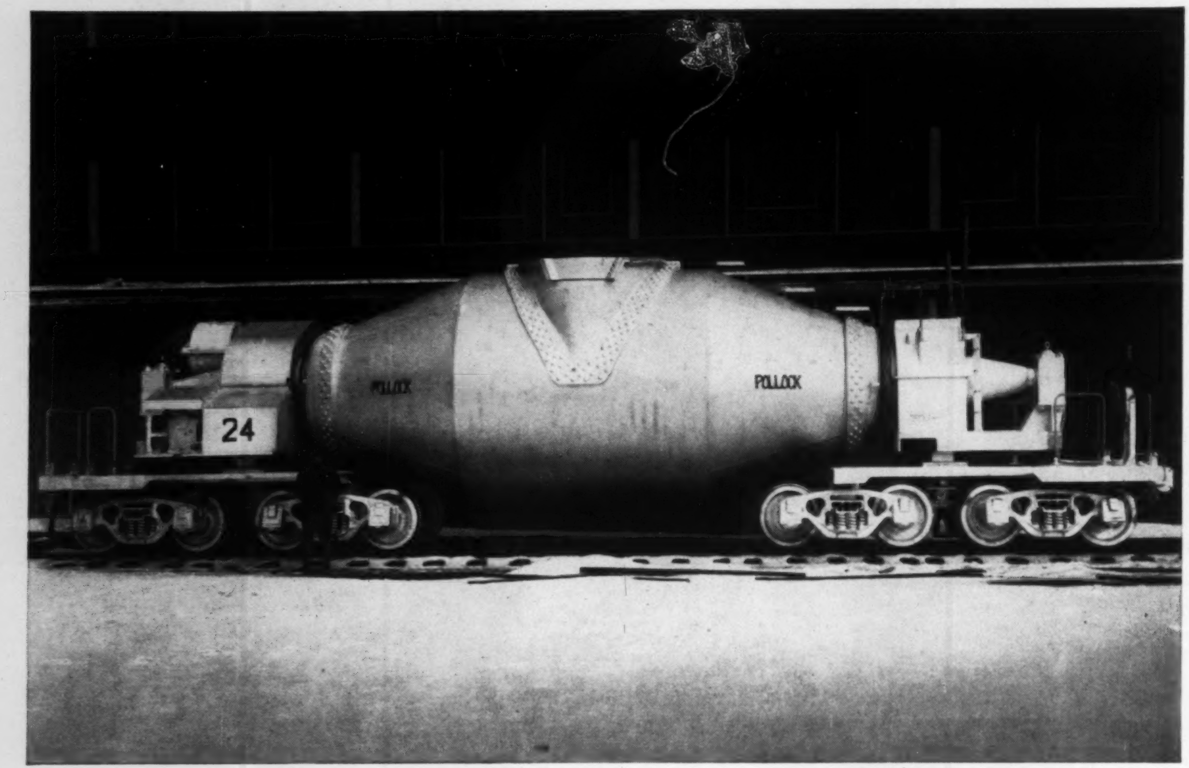
This Roller Leveler has individual motor-operated backup roll adjustments. 1¾" dia. x 72" face . . . 21 rolls.

BLAW-KNOX

Aetna-Standard Division

BLAW-KNOX

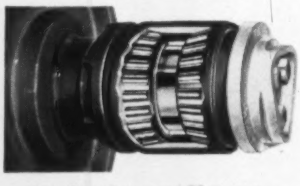
Hot car rolls on cool bearings—



Weighing a whopping total of 360 tons, this car transports 200 tons of hot metal from blast furnace to refining unit. To be sure of cool running wheel bearings to make the car roll easier, take the terrific loads and shock, the car manufacturer—The William B. Pollock Co.—specified Timken® heavy duty "All Purpose" tapered roller bearings, the type used on more and more of America's freight cars. Because Timken bearings *roll* the load they practically eliminate friction. Cars start and roll easier, saving power. And because of their tapered design Timken bearings take *both* radial and thrust loads. No auxiliary thrust collars are needed. Timken "AP" bearings come pre-assembled, pre-lubricated, ready to install. They will go 4 years without adding lubricant. Maintenance is reduced, car availability increased. By reducing friction, they cut locomotive wheel spinning, decrease wheel wear, eliminate flat spots on rails and increase rail life.

YOUR SAVINGS MOUNT when you use the services of our graduate engineer salesmen. They'll work with you at the design stage, can often solve your bearing problems *on the spot.*

GREATER BEARING ACCURACY is assured through super-sensitive gages in our master gage laboratory, one of industry's finest. Some instruments measure even the thickness of several molecules.



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